NETWORK WORLD
The Newsweekly of User Networking Strategies

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IBM vows to lead OS/2 LAN charge

By Susan Breidenbach
West Coast Bureau Chief

RESEARCH TRIANGLE PARK, N.C. — After nearly a year on the market, networks based on Microsoft Corp.'s OS/2 LAN Manager have failed to capture the user community's fancy, and there is a growing sense that the fate of the technology is in IBM's hands.

That raises the question of just how strategic local nets really are to the mainframe giant, which is frequently accused of trying to resist customer moves toward distributed microcomputing.

In a daylong briefing here last week, IBM stated that local networks play a key role in customers' information system strategies and said it is poised to lead the OS/2 network charge into the 1990s. Officials acknowledged OS/2's slow start and said future enhancements to OS/2 Extended Edition LAN Server are being shaped in response to user demands.

"All of our development labs have gotten more into the mode of using customer councils and changing product plans based on their input," said Michael O'Brien, director of telecommunications systems marketing for IBM.

O'Brien said the level of IBM's commitment to local networks can be measured by the fact that OfficeVision — the company's

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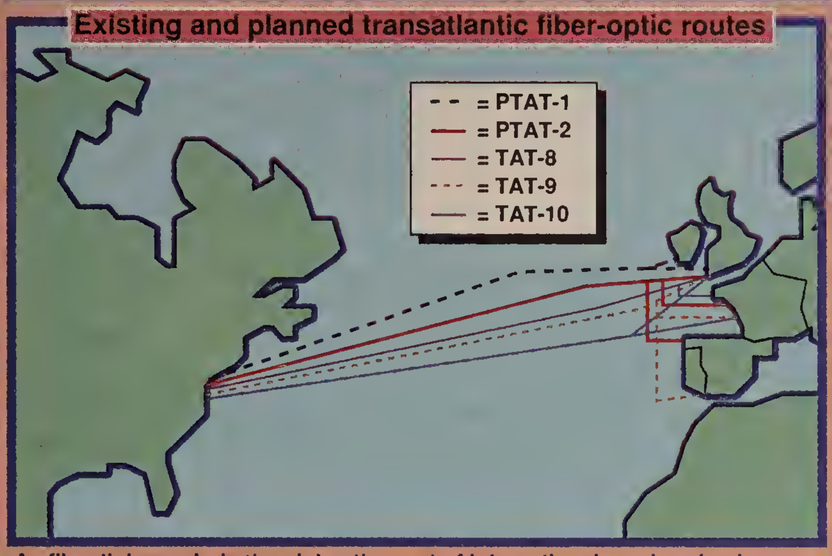
A glut in international network capacity?



As fiber links encircle the globe, the cost of international services begins to plummet. See story page 6.

GRAPHIC BY SUSAN SLATER SOURCE: KESSLER MARKETING INTELLIGENCE CORP., NEWPORT, R.I.

Northern Telecom gives up on costly data net system

Ends sale, manufacture of 10-month-old Meridian Data Networking System after $100m investment.

By Bob Wallace
Senior Editor

RICHARDSON, Texas — Northern Telecom, Inc. last week pulled the plug on its Meridian Data Networking System (DNS) just 10 months after the product was introduced.

DNS, unveiled last October, was the fruit of a two-year, $100 million development effort and was billed as a strategic new direction for Northern Telecom, which has made its name as a manufacturer of telephone switching equipment.

DNS was designed to merge disparate computers and local- and wide-area networks into a single, centrally managed net that integrates voice and data traffic.

But the company decided to scrap the DNS project, saying only two users have installed the system to date. Analysts said the move is a crippling blow to Northern Telecom's plan to establish itself as a major player in the data communications market.

"There are no current plans to

(continued on page 66)

AT&T preps service for states, schools

SDN-based service will enable state universities and gov't agencies to share nets, reap savings.

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — AT&T is readying a customized version of its Software-Defined Network (SDN) service that will enable government agencies and public universities to aggregate traffic and receive volume discounts.

Although AT&T is still working out details with key customers, sources said the service will allow state agencies and universities in one or more states to set up joint networks and receive discounts based on the total volume of traffic.

The service may be offered under a new filing — Tariff 17 — or as an option under an existing arrangement, such as Tariff 12 or Tariff 1.

AT&T officials acknowledged the service but declined to provide any details. "We are actively developing a strategy to focus on the state government and state education marketplace," said Jeff Miller, national industry manager for higher education at AT&T. He said the service is in the final planning stages and would be rolled out soon.

Richard Walker, general manager of AT&T College and University Systems (ATTCUS), a wholly owned AT&T subsidiary that provides value-added billing services to universities, said the service will compete with a similar offering from US Sprint Communications Co. — the State Interconnected Government Network (SIGN).

"We're looking at offering this capability so that we can be com-

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INSIDE

Networks help the F/A-18 get off the ground, page 23.

User high on ISDN despite cutover woes

By Bob Wallace
Senior Editor

BOSTON — John Hancock Mutual Life Insurance Co., the first New England company to use AT&T's ISDN Primary Rate Interface, weathered a rocky cutover but remains enthusiastic about the integrated voice/data service.

Although the installation was three weeks late and John Hancock had to contend with inexperienced AT&T technicians, the company believes Integrated Services Digital Network services will help it save on access lines and serve its customers better.

One of the biggest implementation problems the company experienced was the lack of coordination between AT&T network technicians and AT&T equipment technicians. "AT&T's network and equipment people should've been better organized," said Robert Hastings Jr., manager of home

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NETLINE

3COM OFFERS UP 10-user version of 3+Open with Demand Protocol Architecture. Page 2.

WHAT ROLE WILL IBM's High Level Language API have in an APPC world? Page 2.

USERS PIN DOWN carriers with service-level agreements. Page 4.

AS NYNEX WALKOUT DRAGS on, users give mixed marks to carrier's performance. Page 7.

CITY OF ANCHORAGE SELLS its telephone company, saying a private firm can handle changing technology better. Page 7.

TERMS OF CONFUSION: What exactly do you mean? Page 45.

NEWSPAPER

FEATURE

Cellular phones: only the illusion of privacy

By Robert Corn-Revere
Special to Network World

The boom in cellular phone use has made the technology seem as commonplace to many people as the telephones on their desks or in their homes. However, there is a big difference: Cellular telephone calls are highly vulnerable to eavesdropping. Such calls, transmitted in part by radio, may be overheard by anyone who has the right equipment.

More than two years ago, the Washington Legal Foundation asked the government to mandate that cellular phones bear a label stating, "Privacy of communications may not be ensured when using this phone." But in July 1987, the Federal Communications Commission denied the request. The commission found that the proposal "is not in the public interest at this time."

In March of this year, the FCC rejected a proposal to require

(continued on page 32)

3Com adds 10-user version of 3+Open LAN Manager

Entry System II rivals 8-user version of NetWare, supports 3Com's Demand Protocol Architecture.

By Tom Smith
New Products Editor

SANTA CLARA, Calif. — 3Com Corp. last week announced a 10-user version of its 3+Open LAN Manager Version 1.1 that includes its long-awaited Demand Protocol Architecture (DPA).

3+Open LAN Manager Entry System II offers the same functionality as 3+Open LAN Manager Advanced System, which supports an unlimited number of users. It will compete against an eight-user version of Novell, Inc.'s NetWare. 3Com had previously announced plans for a five-user version of the software.

Alan Kessler, director of marketing for 3Com's Distributed Systems Division, said the product will also let users try out the company's OS/2-based 3+Open for possible use in larger nets.

The new version of 3+Open employs DPA, which lets workstations support two protocols, one designated as a primary protocol and the other as a secondary protocol. Both protocols reside in workstation memory, enabling 3+Open to toggle between them as needed.

Protocols supported include IBM's Network Basic I/O System, Xerox Corp.'s Xerox Network Systems and Transmission Control Protocol/Internet Protocol.

The product offers both price and performance benefits over Novell's eight-user ELS NetWare Level II, Kessler said. The eight-user version of ELS NetWare Level II costs $1,895, Novell said, while 3Com's new offering is priced at $1,495. 3Com's entry-level product allows "25% more users and costs $400 less," Kessler said.

Like the company's 3+Open Advanced System and the five-user 3+Open Entry System, 3+Open Entry System II supports all 3+Open value-added services: 3+Open Mail; 3+Open Internet, which lets nets in different locations share resources and electronic mail; 3+Open Start, which allows workstations without hard disks to be booted remotely from a file server; and 3+Open LAN Vision, which provides a graphical display of network statistics using OS/2's Presentation Manager.

All three systems — 3+Open LAN Manager Entry System, 3+Open LAN Manager Entry System II and 3+Open LAN Manager Advanced System — are scheduled to ship by the end of the month. ◘

Fate of HLLAPI uncertain as use of IBM APPC grows

Users and analysts disagree on the API's future.

By Paul Desmond
Senior Writer

The fate of a widely used IBM application program interface (API) that simplifies personal computer access to mainframe applications is becoming unclear as the use of IBM's Advanced Program-to-Program Communications grows.

IBM's High Level Language API (HLLAPI) can be used to develop personal computer applications that support automated log-on and file transfers to a mainframe application, or simultaneous links to multiple applications from a personal computer emulating a 3270-type terminal.

Some users, vendors and analysts say there will be a need for HLLAPI even as applications based on LU 6.2/APPC — which supports peer-to-peer communications between programs regardless of where they run — become more prevalent.

But others say HLLAPI will serve no purpose in an APPC world and users should devote their resources to tailoring applications to support LU 6.2, creating a migration path to cooperative processing applications. They contend that LU 6.2 offers better performance and supports links between a myriad of devices, while HLLAPI is used only with mainframe-based applications that support a 3270 data stream.

There is little doubt that HLLAPI is widely used today. "About three-quarters of the 3270 gateway or emulation packages for PCs support HLLAPI," according to L. David Passmore, a partner at Network Strategies, a consulting practice of Ernst & Young in Fairfax, Va.

Vendors that make products that support HLLAPI insist there will be a market for the interface for a long time to come simply because so many 3270-type applications currently exist.

"Anyone who is going to be building 3270-based applications under Unix will be using HLLAPI," predicted Norm Friedman, vice-president of software development at New York-based Systems Strategies, Inc., which

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Briefs

Did it pass the test? Users will soon be able to access a free on-line data base to examine the results of Open Systems Interconnection interoperability tests. The data base will track the results of interoperability tests conducted by members of OSINET, a vendor group that promotes the use of OSI in the U.S.

As part of the OSINET Testing and Registration Service, OSINET members conduct interoperability tests using National Institute of Standards and Technology (NIST)-developed software. The software verifies that vendors' products meet Government OSI Profile specifications. OSINET members will be charged $20,000 to record test results in the data base. NIST hopes to have the service operating within six months.

Departure plans. Federal Communications Commissioner Patricia Diaz Dennis announced last week she will leave the agency Oct. 1 to become a partner at the Washington, D.C. office of the law firm Jones, Day, Reavis & Pogue. Diaz Dennis, who will head up the firm's communications division, said she hopes to expand the firm's practice in all areas of communications law — common carrier, broadcast and mass media. Diaz Dennis will continue to abstain from voting on 14 FCC proceedings in which the law firm has an interest.

DG adopts NetWare. Data General Corp. and Novell, Inc. last week reached a licensing agreement under which DG will use Novell's Portable NetWare on its Eclipse MV minicomputers and Reduced Instruction Set Computer-based AViiON workstations. Supporting Portable NetWare will enable the DG products to act as servers in personal computer local networks. It will also give local net users access to applications and services running on DG hardware. DG said the products will be available in the spring of 1990.

Remote access to NetWare. Novell, Inc. last week began shipping its NetWare Access Server, which enables up to 15 remote users to concurrently access a NetWare local network. The $1,995 software runs on a standard Intel Corp. 80386-based computer equipped with serial interface hardware for as many as 15 modems and telephone lines. Four-port serial interface boards are available from Novell for $895 each, and as many as four of them can be installed in one NetWare Access Server.

Going mobile. LM Ericsson and General Electric Co. last week agreed to form a joint venture to produce and sell cellular telephones, mobile radio products and Ericsson's Mobitex radio-based mobile data communications system. Ericsson-GE Mobile Communications, which will be owned 60% by Ericsson and 40% by GE, will market the products internationally.

The joint venture will be formed by merging existing units, including Ericsson units in Richardson, Texas, and Montreal, and GE units in the U.S. and Canada. These units collectively employ 2,300 people. In 1990 the new company expects to have 4,750 employees and sales of $1 billion.

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Users leverage carrier competition to get better uptime, performance

By Wayne Eckerson
Staff Writer

Intense competition among carriers is giving users greater flexibility in negotiating service-level agreements that establish strict standards for network performance and support.

Users are ensuring optimal levels of service by employing a variety of tactics, including contract penalty clauses and periodic roundtables to monitor carrier performance.

But while more and more users are pressing market share-hungry carriers for service-level commitments, others have yet to realize they can negotiate such deals.

"Many network managers might assume from predivestiture days that they can't negotiate service-level agreements with carriers," said George Sparks, manager of telecommunications planning at Baxter Healthcare Corp. in McGaw Park, Ill. "But alternative carriers have changed all that."

Users that get the best service-level agreements enter contract negotiations with a clear understanding of their short- and long-term network requirements, according to Gerald Mayfield, president of DMW Group, Inc., a communications consulting firm in Stamford, Conn. Usually this requires a comprehensive assessment to identify performance requirements for individual service areas.

"Users can't simply say they want 99.995% uptime; they have to specify the availability needed for different circuits at different times of the day," Mayfield said.

In addition, users need to enlist experienced legal counsel to make sure those requirements are written into the final contract, Mayfield said.

Penalty threats

To ensure compliance with the agreements, many users include penalty clauses that punish carriers for failing to meet agreed upon performance or service levels. The penalties usually take the form of billing credits or rebates from carriers.

Although most users rarely exercise the penalties, they agree that the threat keeps carriers on their toes.

Two years ago, Ford Motor Co. signed a five-year, multimillion-dollar Tariff 12 contract with AT&T. The contract called for AT&T to provide 99.5% uptime for all individual circuits and imposed penalties if the carrier failed to meet that level of performance, according to Jim Soma, telecommunications services manager at Ford in Dearborn, Mich.

The contract gives AT&T 30 days to restore degraded circuits to agreed upon performance levels and requires the carrier to maintain that level for the following 30 days. Meanwhile, Ford is excused from paying hourly charges on the affected circuits until they reach 99.5% availability.

"I hope I never have to use a penalty," Soma said. "But it's a threat our staff can use to keep the carrier's people motivated to serve our account as expeditiously as possible."

Penalty management

Users can undermine the effectiveness of performance penalties if they make them too harsh, said Bill Rush, a vice-president of information systems at the Prudential Insurance Co. of America in Roseland, N.J. Prudential recently signed a Tariff 12 agreement with AT&T for nationwide voice and data services.

"In the real world, users will probably back off from clubbing the carrier with an excessively stiff penalty, making the penalty an idle threat that carriers can ignore," Rush said.

Rush suggested that users never impose penalties in excess of the total monthly price of the affected circuit. In addition, penalty charges should start low and then escalate to higher levels until the circuit is restored. Penalty charges on circuits that support critical applications should escalate more quickly than charges for other circuits, he said.

He also said penalties lose their effectiveness if the carrier doesn't keep track of them. Penalty charges should be summarized every month in a report and given to the carrier's senior management.

"Once the carrier's top executives add up all the nickels they're paying in penalties each month, they will be more attuned to adhering to the performance guidelines set forth in the contracts they sign," Rush said.

> "Once the carrier adds up all the nickels it's paying in penalties, it will be more attuned to adhering to performance."

▲▲▲

Other tactics

Users can minimize exposure to service problems in other ways. Having the carrier provide alternate routing, for example, maintains maximum uptime for circuits and eliminates the need to impose penalties on the carrier.

For many, the real work of ensuring network performance and service levels comes once the contract has been signed.

William Johnson, corporate director of telecommunications at F.W. Woolworth Co. in New York, holds quarterly discussions with the carrier's marketing, network operations and engineering staff to review service performance. Often, decisions to purchase new communications facilities hinge upon those status reports and reviews, he said.

Johnson is also asking carriers to provide regular traffic reports on each leased circuit. These reports would help Woolworth monitor data traffic patterns as well as determine whether the carrier is providing the requisite quality of line service.

"It's tough to negotiate service-level agreements that have any real impact," Johnson said. "So it's critical to manage the carriers once they begin providing service for you." ☐

Correction: The story "Spreading the EDI word," (*NW,* July 10) incorrectly reported the name of the Sears, Roebuck and Co. unit that markets communications services. Sears Communications Co. is the market arm for the communications network.

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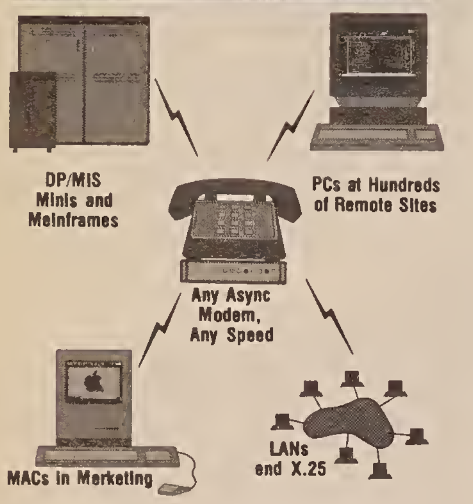

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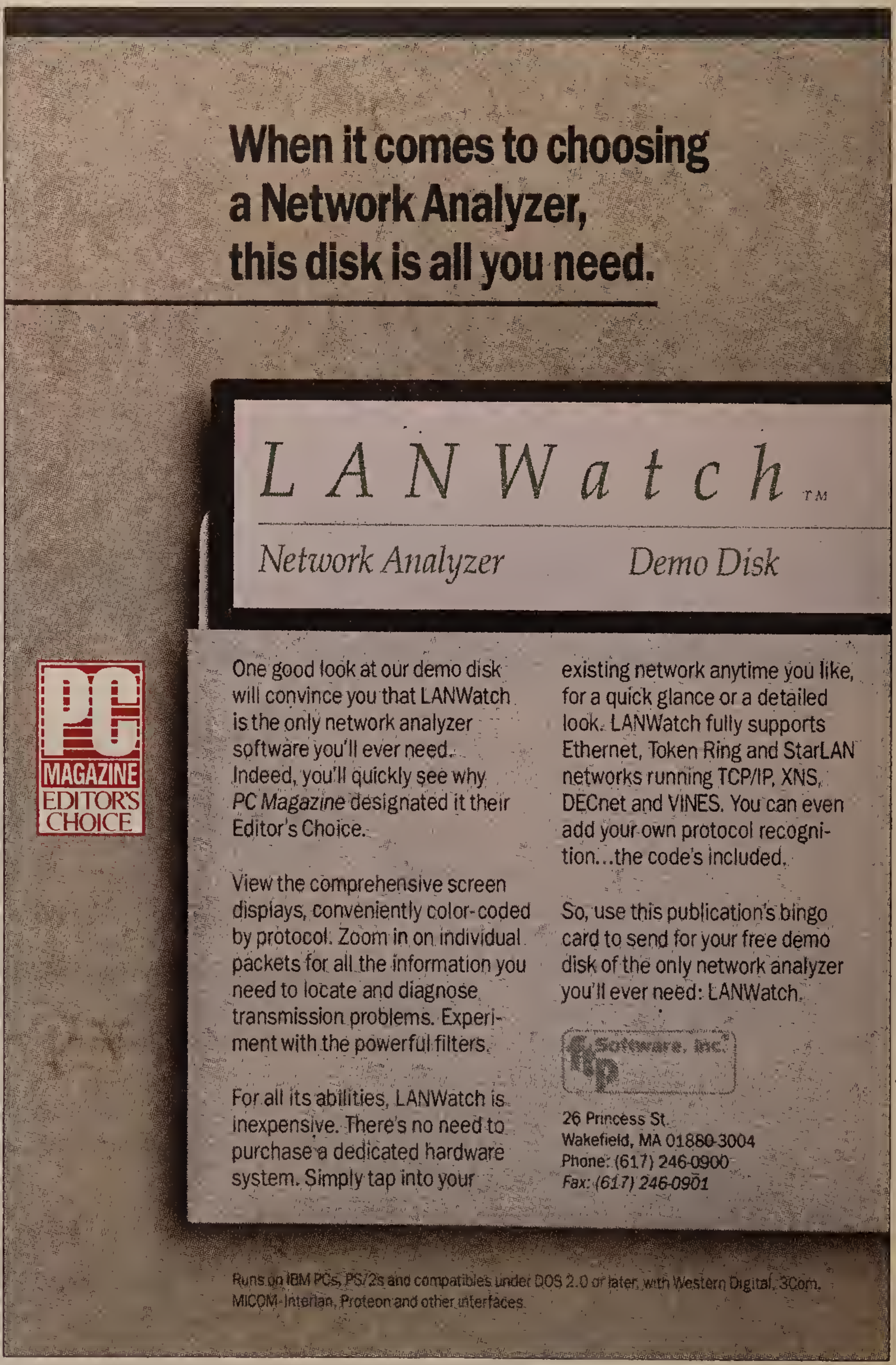

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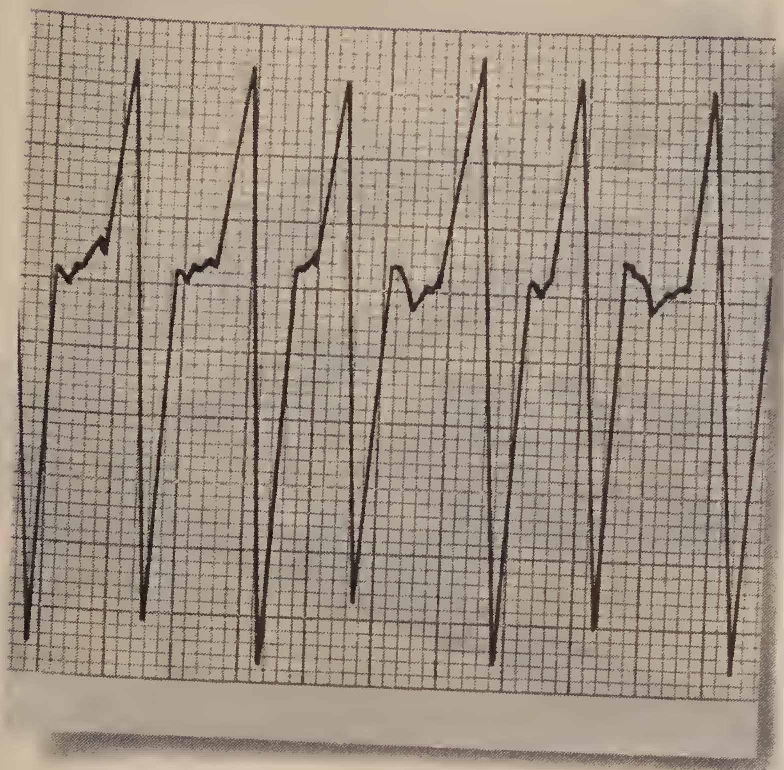

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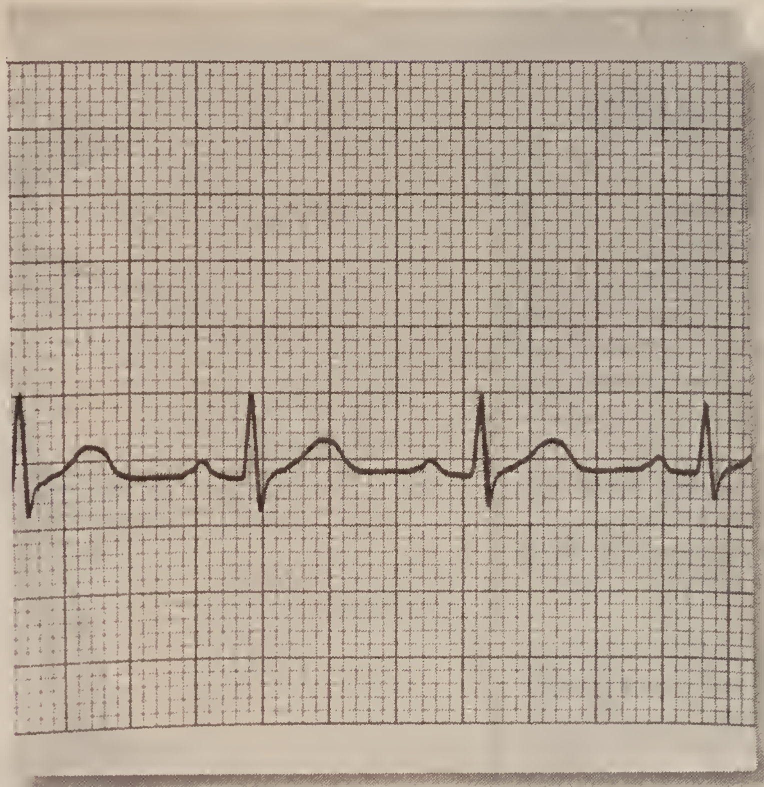

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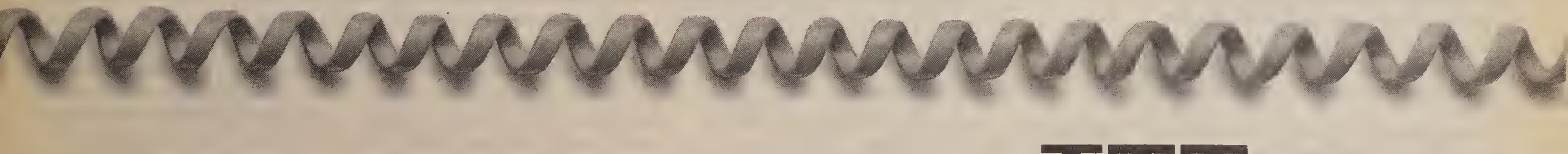

COMMUNICATIONS SERVICES VIA ITT

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Digilog takes wraps off system for local net monitoring and mgmt.

By Paul Desmond
Senior Writer

NEW YORK — Digilog, Inc. last week announced a local network diagnostic and management system that can be used to monitor multiple local networks of various types from a central site.

Digilog's LANVista, announced at a press conference here, consists of hardware and software that can be configured to collect statistics on network utilization, conduct cable tests and display alarms from devices on multiple Ethernet or token-ring networks.

The initial version of LANVista supports Transmission Control Protocol/Internet Protocol, as well as protocols used with Digital Equipment Corp.'s DECnet, Xerox Corp.'s Xerox Network Systems, Novell, Inc.'s NetWare and an array of Department of Defense protocols, said Dave Ushler, director of engineering at Digilog.

The product, which currently supports coaxial cable-based nets, comes in three configurations. The stand-alone system consists of what Digilog calls a personal computer slave board, which is used to collect network statistics, and LANVista master software, which drives the system.

A second configuration comes with an Intel Corp. 80386-based personal computer, the slave board and master software.

The third version is the distributed LANVista, which is used to manage multiple local nets from a single site. The distributed version comes with master software and one or more slave boxes, which are microprocessor-based devices that each support one slave board. One slave box is attached to each local or remote network that is to be supported by LANVista. The slaves feed data to a personal computer running the master software via an RS-232 connection or — with the addition of a Master Interface Card — over regular local net connections. The boxes also come with an expansion slot that can support a modem board for communications with the master. A master can also be configured with multiple boards that each support a different local net.

LANVista collects and presents statistical data in bar graph format from the entire network or an individual net.

The product also displays alerts and alarms generated by devices on any local net but cannot be used to route traffic around failed links or devices, or to take a failed device out of service, Ushler said.

Available next month, LANVista pricing starts at $9,000 for the stand-alone version. The integrated version, with the personal computer and one slave board, starts at $16,800. The distributed configuration starts at $11,500.

Digilog can be reached by writing to 1370 Welsh Road, Montgomery, Pa. 18936, or by calling (215) 628-4530. ◘

Undersea fiber cables to herald low int'l rates

By Barton Crockett
Senior Editor

The price of some international communications services has dropped 50% since December, and analysts predict that by 1996, the average cost of all international communications services could decline by 22% to 40%.

The reason? Undersea fiber-optic cables. Not only are undersea fiber-optic cables less expensive to operate than their coaxial ancestors, they offer far more capacity.

With only two undersea fiber cables out of the 11 planned for the U.S. in commercial service, users already have seen the cost of dedicated, transatlantic 56K bit/sec circuits from AT&T drop by more than half.

AT&T charges $7,500 per month for dedicated 56K bit/sec circuits over coaxial undersea cables and $3,400 per month for the same circuit on a fiber-optic cable.

Satellite prices plummet

In addition to driving down the cost of cable-based services, the advent of fiber-optic undersea facilities is causing satellite prices to plummet. Today, the majority of international private-line traffic is carried via satellite because the dedicated cable circuits have had limited availability and have been prohibitively expensive.

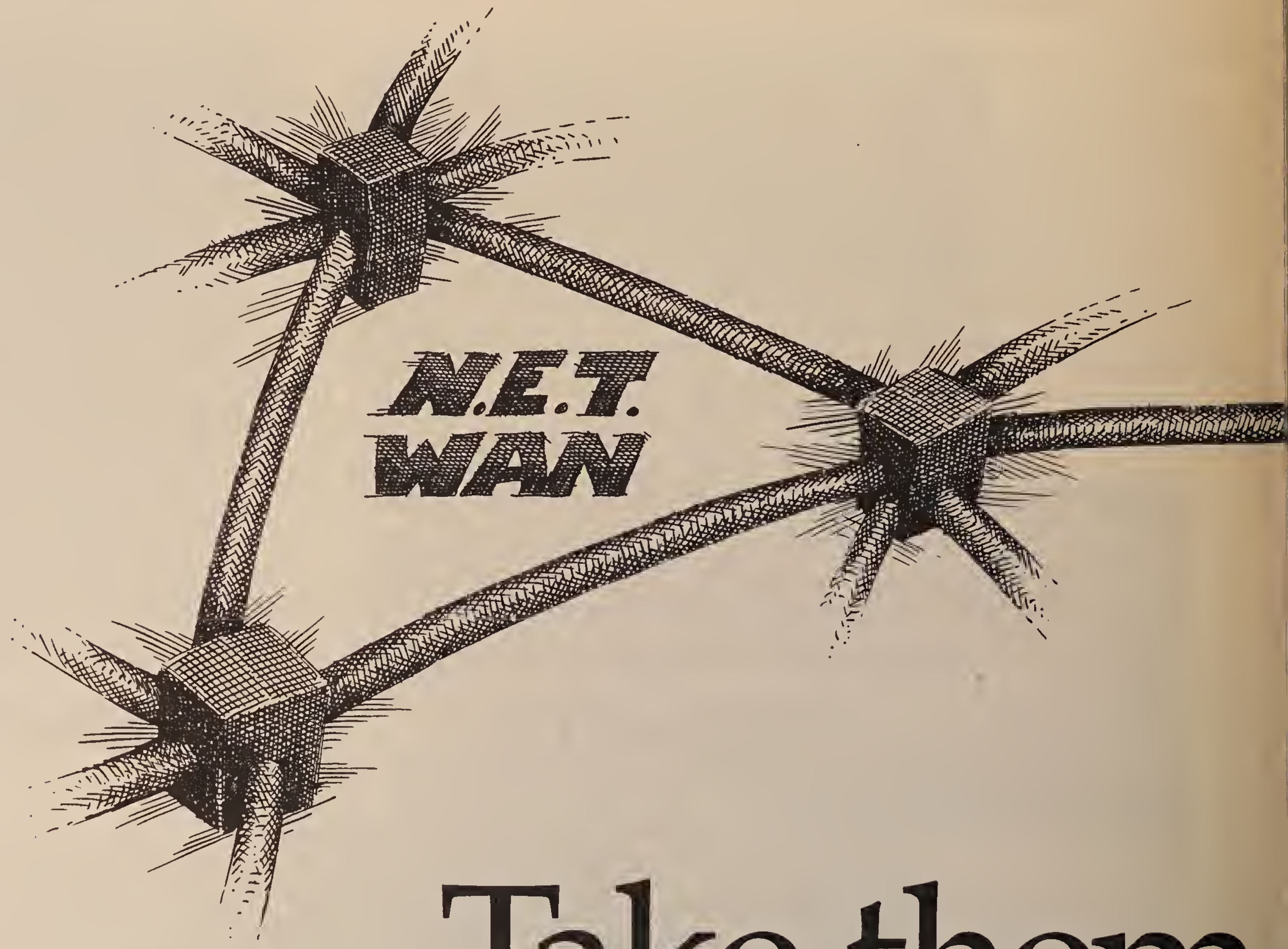
Yet, with the expected proliferation of fiber-optic cables, viable terrestrial alternatives to satellite are becoming available. What's more, in some areas of the world — particularly in the Atlantic arena — prices for fiber cable circuits have dipped below prices for similar satellite-based circuits.

Faced with the prospect of losing customers to the now cost-competitive, alternative communications media, satellite service providers have begun cutting prices.

Washington, D.C.-based Comsat World Systems, Inc., for instance, has cut prices for dedicated, international private-line circuits by an average of 20% over the past year and a half, according to Bruce Crockett, the company's president.

But unless the price cuts continue, several users said they will abandon satellite service in favor of what they see as a better alternative: fiber-optic-based systems.

(continued on page 66)



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Nynex projects put on hold as strike continues

By Gail Runnoe
Washington Correspondent

WASHINGTON, D.C. — Users in the New York Telephone Co. and New England Telephone Co. regions are giving the carriers mixed reviews for their performance during a bitter, ongoing strike against parent company Nynex Corp.

As of press time, approximately 160,000 workers from the Communications Workers of America (CWA) and the International Brotherhood of Electrical Workers (IBEW) remained on strike against Nynex, Ameritech and Bell Atlantic Corp. Nynex and Bell Atlantic workers have been off the job since Aug. 6.; the Ameritech strike began Aug. 13.

No meetings were held between Nynex and striking workers last week, but talks are scheduled to resume on Wednesday. Health care issues are expected to be the most hotly debated. A CWA spokeswoman said, "Our people feel they should not be penalized by being asked to pay more" for health care benefits.

Bell Atlantic reached a tentative agreement with CWA workers on major financial issues earlier this month, but local issues such as job titles and grievance procedures were still being worked out at union chapters in New Jersey and Pennsylvania last week. The company also met throughout the week with IBEW representatives. The regional Bell holding company's 41,000 CWA workers have said that even if their tentative contract is approved, they will not cross IBEW picket lines.

The 15-day strike by 42,000 employees of Pacific Telesis Group's Pacific Bell and Nevada Bell operating companies ended last week when the company reached a tentative agreement with CWA union leaders.

Ameritech operating companies were still talking with CWA officials as of press time. A union spokesman said, "The fact that we're even talking is a good sign."

Grinding to a halt

Strikes have halted important network projects for some users in Nynex's territory. Before the strike, the Securities Industry Association (SIA) had contracted with New York Telephone for a private fiber-optic network linking roughly 200 downtown sites. No progress has been made on the project since the strike began. SIA member firms, including Drexel Burnham Lambert, Inc., Prudential-Bache Securities, Inc. and Shearson Lehman Hutton, Inc., are waiting to be brought onto the network.

The network is expected to save participating members as much as 42% on private-line costs, said Arthur Trager, SIA assistant vice-president for administration.

Donald Gaffney, vice-president of telecommunications at Fundamental Brokers, Inc., a participant in the new SIA network, said, "Everything is on hold until Nynex determines what can be done during the strike."

Although New York Telephone told SIA members that it wanted to meet to discuss possible options, Gaffney said, "Quite honestly, I don't feel there are a lot of options open to us."

Larry Holden, vice-president of telecommunications at Merrill Lynch & Co., Inc. — also a participant in the SIA project — said he doubts Nynex will be able to settle with its unions in the near future. "The local [union] leadership is very hard-line in New York," he said. The unions have "always been this stubborn," he added.

Expansion plans for the New England Education and Research network (NEARnet), on the other hand, have been undisturbed by the strike.

According to John Rugo, account manager at Bolt, Beranek and Newman, Inc., the Cambridge, Mass.-based facilities operator for NEARnet, installation of a 56K bit/sec line scheduled last week was completed without delay.

"This kind of news is encouraging," Rugo said. "I'll be able to pass this on to prospective clients." Earlier, Rugo was concerned that businesses or universities would delay joining NEARnet because of concerns about service cutovers during the strike. ◪

Pacific Telecom plans to acquire Anchorage telco

By Tom Smith
New Products Editor

ANCHORAGE, Alaska — The Municipality of Anchorage last week sold its local telephone company — the nation's largest city-owned telephone company — to Pacific Telecom, Inc. for $412 million.

City officials said they sold the Anchorage Telephone Utility (ATU) because they think private enterprise will be better able to deal with the rapid changes in telecommunications technology. ATU is the 22nd largest telephone utility and the 16th largest independent telephone company in the country.

The sale also helps the city financially. The money raised will enable the city to retire $263 million in debt, according to Will Gay, a staff member for the municipal finance department who helped coordinate the sale. The remaining $149 million will be placed in a trust fund to be appropriated by public vote.

ATU operates an all-digital network with 115,000 access lines serving 90,000

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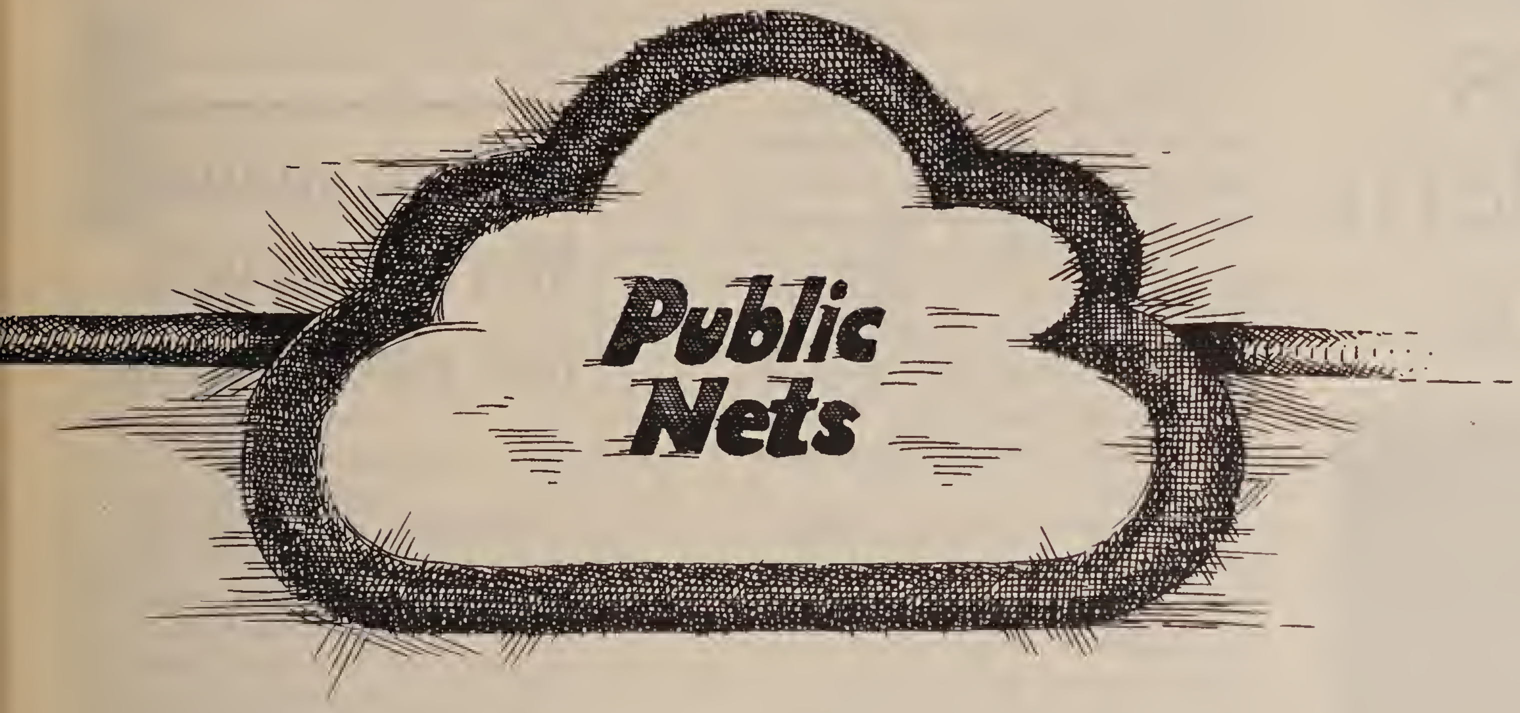

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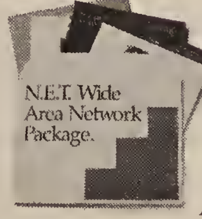

AT&T preps service for states, schools

continued from page 1

petitive with the [US] Sprint offer,'' Walker said.

SIGN, which has been available for about a year, initially allowed state government offices and state universities to share a virtual private network.

The carrier's SIGN offering was expanded this month to also include private universities.

SIGN customers qualify for the same volume discounts offered to high-volume users of US Sprint's Virtual Private Network service. Discounts apply to both on-net and on-net-to-off-net calls and range from 1% for monthly charges between $10,000 and $19,999 to 36% for monthly usage greater than $10 million.

A telecommunications director at a large Midwestern university acknowledged having discussions with AT&T about its new service. Telecommunications directors at several other universities said they had heard about the service but had not yet seen documents on the offering.

Ironing out details

Walker said AT&T is still working out a number of service issues, such as determining whether each institution or agency on the network will receive a separate bill from AT&T and whether one user would be designated as the customer of record. He said the carrier is also evaluating how calls would be tracked and charged to the correct user since network customers will not be related.

''Every institution wants to be assured that they're not being charged one nickel more than what they should be charged. Those are issues we are evaluating right now,'' Walker said.

> AT&T is evaluating how calls would be charged to the correct user since network customers will not be related.

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Darrell Eschbach, executive director of telecommunications at Arizona State University in Tempe, Ariz., said US Sprint's service has been very popular with users and he expects AT&T's offer to be well-received.

Eschbach said he is currently talking to AT&T, US Sprint and MCI Communications Corp. about a shared network arrangement that would allow his university and the two other major schools in the state — Northern Arizona State and the University of Arizona — to aggregate traffic.

Ted Vagelos, director of telecommunications at Vanderbilt University, a private college in Nashville, agreed that AT&T's service will be popular but expressed disappointment that it would not be offered to private institutions.

''If we could all get together and be part of an SDN plan, it would be extremely advantageous for universities,'' he said.

Vagelos said he was approached by MCI some time ago with the idea of a shared network for universities. He said he asked AT&T if it could develop such an offer but has not heard from either carrier since.

Steve Carnilla, director of telecommunications at the University of Chicago, another private institution, said his university had approached AT&T three months ago about a shared network with other universities but did not receive an answer.

MCI to manage Merrill Lynch net operations

By Barton Crockett
Senior Editor

NEW YORK — Merrill Lynch & Co., Inc. has signed a letter of intent to have MCI Communications Corp. assume control of its network management operations, complementing a $150 million contract for long-distance services the brokerage firm awarded to the carrier in June.

The new contract brings Merrill Lynch one step closer to wrapping up negotiations on a $400 million request for proposals it issued last year. The RFP sought a company to supply transmission services, take control of network management operations, maintain and service the firm's network equipment and buy back the company's two AT&T 5ESS switches.

MCI won the transmission component of the RFP last June, the carrier's single largest contract ever (''Merrill Lynch to sign MCI as lead carrier,'' *NW,* June 12).

Now MCI will take over Merrill Lynch's network management operations, according to a source familiar with the deal. Details concerning how MCI will manage the network have yet to be worked out but are to be finalized over the next 30 days.

When the original MCI contract was awarded, Robert Niebanck, Merrill Lynch's first vice-president and director of telecommunications, said MCI could conceivably subcontract the brokerage company's network management operations to Electronic Data Systems Corp. (EDS).

EDS could handle Merrill Lynch's network management operations from the EDS network control center in Plano, Texas.

The source said Merrill Lynch has decided against awarding the facilities management component of the original RFP to a carrier because it was determined that

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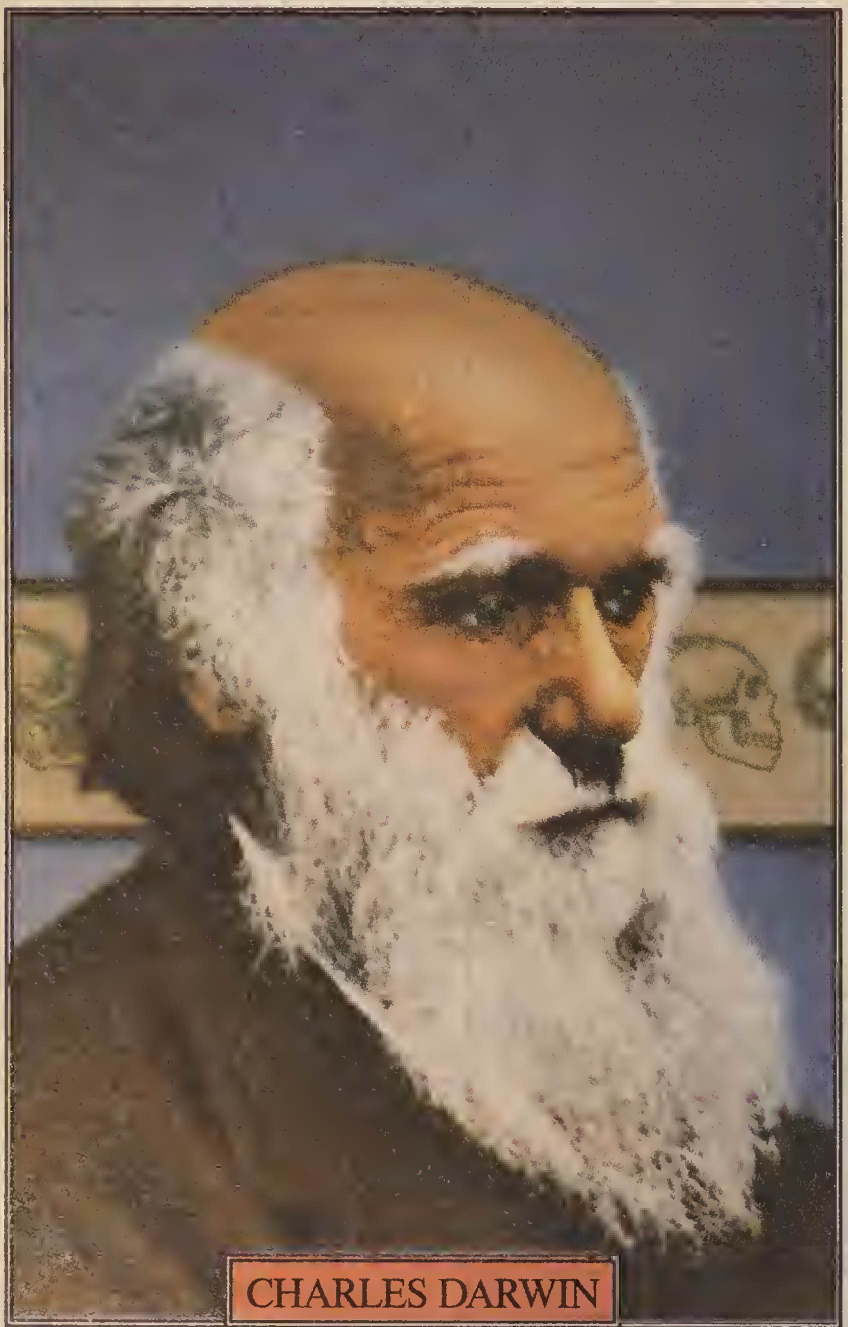

Photograph: The Bettmann Archive.

Charles Robert Darwin, English naturalist, 1809-1882. His books *On the Origin of Species* and *The Descent of Man* established the principle of natural selection, and became the foundation of evolutionary theory for the next 100 years.

Charles Darwin proposed that species evolve continuously, and that the best adapted variations survive. Racal-Vadic's award winning lineage of 2400 bps modems has also evolved—into a whole new generation of advanced V.22*bis* products.

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INDUSTRY UPDATE

VENDOR STRATEGIES, MARKET TRENDS AND FINANCIALS

Worth Noting

The number of acquisitions of information services and software firms fell to 168 during the first six months of 1989, down 12% from the 190 deals reported during the first half of 1988, according to a recent report by Fort Lee, N.J.-based Broadview Associates/ADAPSO.

People & Positions

T-1 multiplexer maker **Network Equipment Technologies, Inc. (NET)** last week appointed **Craig Gentner** vice-president of finance and **James Regel** vice-president of sales operations.

Before joining NET, Gentner served as senior vice-president and chief financial officer at Xidex Corp. in Santa Clara, Calif. In his new post, he will be responsible for NET's financial operations.

Regel came to NET from INSTOR Corp. in Redwood City, Calif., where he was president and chief executive officer. At NET, he will be responsible for marketing operations, sales development, technical training and IBM channel marketing.

NET, based in Redwood City, manufactures and markets communications products and services used in private wide-area networks.

Ameritech announced that effective Sept. 1, **Ramon Humke** will be president of **Ameritech Services, Inc.** and senior vice-president of **Ameritech Bell Group.** Ameritech Bell Group includes Illinois Bell Telephone Co., Indiana Bell Telephone Co., Michigan Bell Telephone Co., The Ohio Bell Telephone Co., Wisconsin Bell, Inc., Ameritech Applied Technologies, Ameritech Information Systems and Ameritech Services.

Humke is currently president of Indiana Bell. ◘

Packet net deals a boon for industry

By Bob Brown
Senior Editor

The snowballing interconnection of local packet networks and major interexchange packet-switching nets may boost both services by making them easier and cheaper to use, carriers and industry observers said.

Through carrier interconnection agreements, users of interexchange packet services gain access to customers on packet nets offered by local exchange carriers and vice versa. Using local packet nets to access long-haul packet services can be less expensive than other access options such as private lines.

The interconnection agreements will also pave the way for electronic data interchange and electronic mail service agreements, analysts said.

The number of such interconnection agreements is expanding rapidly. Two weeks ago, Reston, Va.-based Telenet Communications Corp. said it will provide interexchange data transport via its Public Data Network for users of local packet-switching nets.

In addition to Telenet's announcement, local carriers have been announcing similar interconnection arrangements with AT&T on a regular basis. Pacific Bell, for example, announced an interconnection arrangement with AT&T's Accunet Packet Service earlier this month. (Pacific Bell already has connections with Telenet and McDonnell Douglas Corp.'s Tymnet public data network, the two most widely used networks.)

Hard-to-reach users

Packet network interconnection agreements increase the reach of both national and local services, benefiting both carriers and their customers, according to Dominick DeAngelo, Telenet's vice-president of marketing for network services.

> The interconnection agreements will pave the way for EDI and E-mail service agreements.
>
> ▲▲▲

"We can get access to medium and small businesses we usually can't target with our sales force," he said.

Interexchange packet service carriers typically set up packet access points in locations where there is a high concentration of users, he said. The local packet nets cover areas where interexchange packet service providers don't have a presence.

(continued on page 10)

INDUSTRY BRIEFS

CASE/Datatel, Inc. and **NCR Corp.** announced last week that they have entered into a joint marketing and service agreement under which NCR will sell T-1 multiplexers, X.25 switches, packet assembler/disassemblers, network management systems, modems and other products from CASE/Datatel.

Under the nonexclusive agreement, NCR can either purchase the products from CASE/Datatel and resell them to its customers, or market them jointly with CASE/Datatel.

Apple Computer, Inc. was awarded a contract last week to supply between 10,000 and 80,000 A/UX-based Macintosh II workstations to U.S. military posts worldwide over a five-year period. A/UX is Apple's implementation of the Unix operating system.

The contract was awarded to Apple by Honeywell Federal Systems, Inc, which is overseeing the Worldwide Military Command and Control System. This is Apple's largest contract to date for its Unix operating system.

"The win demonstrates [Apple's] ability to compete successfully in large-scale systems integration bids," said Greg Shuk, director of Apple's Federal Systems Group.

While Honeywell's contract with the government has been valued at $164 million, the value of Apple's portion of the contract was not disclosed.

The Macintosh IIs will run applications including office automation, information management and engineering support, and will communicate with existing minicomputers and mainframes. ◘

OSF gets high marks for progress to date

But Open Software Foundation executives and others say the future holds major challenges.

By Bob Brown
Senior Editor

CAMBRIDGE, Mass. — Open Software Foundation (OSF) executives and industry watchers say they are pleased with OSF's progress to date, but they acknowledge that the future holds a number of challenges for the group.

OSF is an international organization that was founded by seven computer companies in May 1988 to develop an open, portable software environment. Since it was founded, OSF has earned high marks for delivering its first product — a common user interface — on schedule and for building its membership base to 150 companies.

But OSF faces the challenge of increasing the user voice in its development process. In addition, OSF's current project — the development of a distributed computing environment that would enable users to distribute processing across a multivendor network — is extremely complex. The project will test OSF's skills at coordinating different vendors' technologies.

The project also pits a number of rival companies against one another.

Last week, Netwise, Inc. said it will submit its remote procedure call (RPC) technology for consideration by OSF. The company's move was endorsed by Data General Corp., NCR Corp., Novell, Inc., Unify Corp. and Wang Laboratories, Inc.

Digital Equipment Corp. and Hewlett-Packard Co.'s Apollo Division earlier said they would submit to OSF an extended version of the RPC component of Apollo's Network Computing System. In addition, Sun Microsystems, Inc. last week said it will submit its RPC technology to OSF ("OSF asks users, vendors for distributed computing specs," *NW*, June 19).

One for one

Avoiding the bureaucracy and infighting common among organizations formed by rival vendors, OSF actually developed and released its first product — the OSF/Motif common user interface — as planned in May.

Hundreds of copies of OSF/Motif software have been purchased by vendors and software developers, and the first commercial OSF/Motif products have already hit the market, according to Ken Sills, OSF's director of communications. "We've brought together various companies' technologies and added value," Sills said. "I only hope we can reproduce our success with the [graphical user interface] on our future [requests for technology]."

OSF/Motif has given OSF a boost, Sills said. It has been well accepted by members and others outside the group, some of whom were skeptical of OSF's intentions, he said.

"I applaud OSF for getting its first product out on time," said Bart Stuck, president of Business Strategies, a Westport, Conn.-based consulting firm.

Misses the point

From the outset, OSF was labeled by industry watchers as a rival to a group led by AT&T and Sun — now known as Unix International, Inc. — that is working to develop a standard version of the Unix operating system. But agreeing upon a standard version of Unix is only part of OSF's open computing environment effort, Sills said.

The OSF guiding principles

- ☐ Offerings based on relevant industry standards.
- ☐ Open process to actively solicit input and technology.
- ☐ Timely, vendor-neutral decision process.
- ☐ Early and equal access to specifications and software.
- ☐ Hardware-independent implementations.
- ☐ Reasonable, stable terms for licensing.
- ☐ Technical innovation through universities and research.

OSF

SOURCE: OPEN SOFTWARE FOUNDATION, CAMBRIDGE, MASS.
GRAPHIC BY SUSAN SLATER

"Through our accomplishments, I think we've shown our critics that all this talk of a Unix war is meaningless and misses the point of OSF. Our open software environment goes far beyond Unix," he said.

When asked about OSF's strengths, Sills said he is pleased with the group's technology selection process. "It's not just what we did, but how we did it."

After issuing an RFT and receiving proposals, OSF members

(continued on page 10)

Packet net deals a boon for industry

continued from page 9

Kathy Ferris, manager of communications for industry marketing at Tymnet, said the interconnection agreements provide users with a backup option in case their primary link into the Tymnet network is disabled.

The interconnection of long-distance packet-switching networks and local packet networks is analogous to the linkage of long-distance carriers and local operating companies. Users with host computers linked to local packet nets are able to select any interconnected packet net as their long-distance data carrier.

"The packet-switching market is waiting for the ease and convenience that exist in the voice world today," according to Bob Bell, Southwestern Bell Telephone Co.'s account manager for regional sales.

Good news

Most industry watchers said the interconnection pacts are beneficial for users, although some said the local carriers currently serve small niche markets.

"It's good news for users," said Barry Gilbert, a principal at TFS, Inc., a Westford, Mass.-based market research firm. "The more access points and alternatives users have to get onto packet networks, the better off they are."

"While the RBHCs could be seen as a threat to the other packet-switching network carriers, they can also be complementary," said Roberta Wiggins, a senior analyst at The Yankee Group, a Boston-based market research firm. "That's good for carriers and users."

But not all the signs have been rosy in the interconnection game. For example, Globenet recently announced that it is selling its customer base to Alba Data Technology, Inc., which runs the Data America packet-switching network.

Globenet has specialized in providing interconnection service for local packet providers. But the company is now conducting business on a smaller scale due to financial difficulties. Karl Damanda, executive vice-president at Globenet, said the pullout of one of Globenet's major investors, not a lack of business, forced the company to sell its customer base.

However, local packet-switching services have not met the growth expectations of many carriers, he said. ◘

OSF gets high marks for progress to date

continued from page 9

are given a chance to comment on submissions. After the initial submissions are winnowed down, OSF's engineering and strategy personnel pick and choose among the offerings to develop technologies that can be implemented by computer and software vendors in future products.

OSF operates as a neutral party that tries to keep the best interests of all users and vendors in mind, said Jonathan Gossels, OSF's business area manager for interoperability and head of its distributed computing project.

"OSF has hired a good mix of people with both user and vendor perspectives," Gossels said.

Calling all users

Thus far, the one thing missing from the process has been user input, mainly because only a handful of user companies have joined OSF.

"To get OSF rolling, it was critical for us to get the major vendors and independent software vendors on board," Sills said. "Our sales force is now pushing for more user participation."

Jim Presti, manager of computing sciences at Boeing Computer Services Co. and cochairman of the OSF's Database Special Interest Group, is one of OSF's few user representatives. Several others, including Arco Oil & Gas Co. and Shell Oil Co., recently plunked down the $25,000 OSF membership fee.

"More users will join as a matter of course," Presti said. "A lot of users stayed on the sidelines, but when they see the OSF products hit the streets, membership will grow strongly."

Distributed computing

User input would be welcome on the distributed computing environment technologies now being submitted, Presti said.

Distributed computing technologies are scheduled to be selected from submissions during the first quarter of next year, Gossels said.

"The ability for users to communicate and share resources transparently in multivendor environments is becoming a necessity," Gossels said. "Most corporate and industrial users today work in networked environments where computers from multiple vendors are common. By the very nature of its vendor-neutral charter, OSF can play a leadership role since interoperability is inherently a multivendor problem."

Because not all the RFTs have been reviewed as yet, it is too early to say when a product would be available, Gossels said. The RFT calls for technologies in five separate areas, including file sharing and naming. About 45 submissions have been received, which will make developing products difficult, he said.

OSF executives refused to speculate on what the next RFT might be, but Sills said that the most aggressive special interest groups within OSF typically bring their RFTs out first. OSF's special interest groups focus on such areas as Unix for the commercial market, internationalization, a distributed application environment and security. OSF is being careful not to issue too many RFTs at once so that it does not spread its 200-employee staff too thinly, Sills said.

"I think we've got a 10-year job in front of us," he said. "We're nowhere near [an open software environment] today." ◘

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Worth Noting

Secrets of Installing a Telephone System, a $22.95 book that chronicles the planning, design, selection and cutover of an IBM/Rolm PBX at Columbia University, is now available from NSS Associates, an Englewood, N.J.-based consulting firm. For more information, call (800) 542-7279.

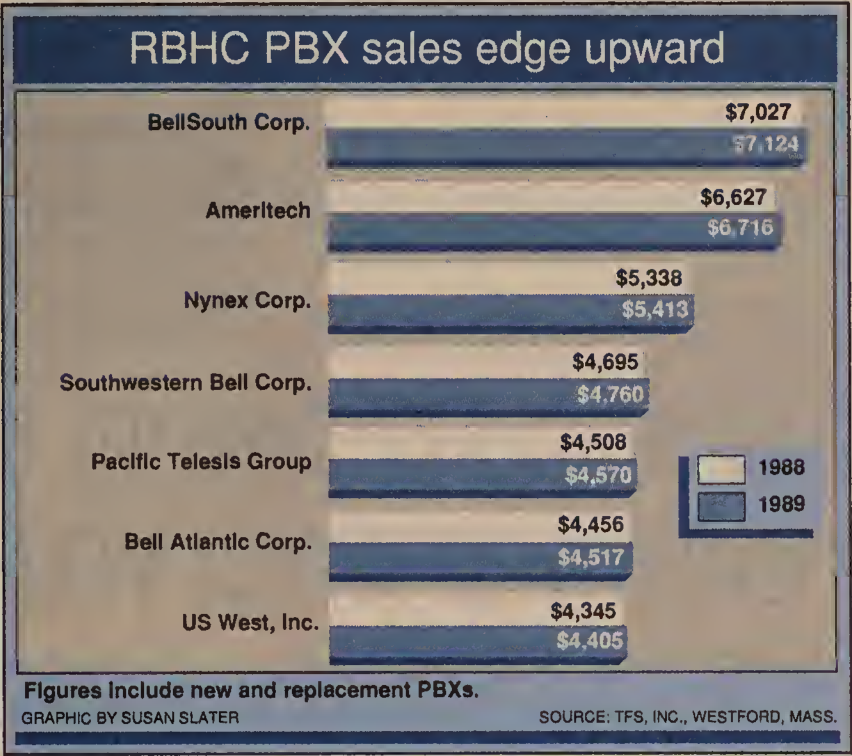
Carrier Watch

Cable & Wireless Communications, Inc. last week slashed rates for its T-1, fractional T-1 and its FiberPoint 56 Kbps service.

The carrier has reduced the monthly fee for FiberPoint 56 Kbps service by an average of 70%. Previous rates for service between New York and Chicago averaged $1,831; the new rate for the route is $427.

Rates for Cable & Wireless' fractional T-1 service, Intelliflex, have been cut by as much as 48%. The monthly charge per DS0 from New York to San Francisco was reduced from $1,781 to $928. The charge for a New York-to-Chicago Intelli-Flex DS0 link was cut from $555 to $427. The monthly charge per Intelli-Flex DS0 between Chicago and San Francisco has been cut from $1,318 to $736. The monthly charge for a DS0 between San Francisco and Atlanta was reduced from $1,502 to $812.

The carrier's Intelli-Flex service enables users to buy bandwidth in 64K bit/sec increments. Charges for T-1 network access ports — ports on a Cable & Wireless cross-connect system — have been reduced from $500 per port to $150 per port, according to the carrier. Cable & Wireless owns and operates a 17,000-route-mile, all-digital fiber and microwave network serving 60 major metropolitan areas, according to a spokeswoman for the carrier. ◘



RBHC PBX sales edge upward

Figures include new and replacement PBXs.

GRAPHIC BY SUSAN SLATER

SOURCE: TFS, INC., WESTFORD, MASS.

New York PSC details plan for its multicity ISDN trial

Says funding, other problems may slow project.

By Tom Smith
New Products Editor

ALBANY, N.Y. — The New York State Public Service Commission (PSC) recently filled in the details of a newly announced multicity ISDN trial, but it warned that interconnection problems, cost issues and the New York Telephone Co. strike could delay the project.

In April, the New York PSC directed the state's telecommunications providers to cooperate on an Integrated Services Digital Network trial and has since designated Jamestown, New York City and Rochester as the state locations to be involved.

Two separate ISDN networks will be established in Phase 1 of the project, and they will be linked in Phase 2, according to Louis Ceddia, principal system planner in the New York PSC's Communications Division, which presented the report to the full commission. The second phase will begin in the first quarter of 1991 and continue into 1992.

The trials will use an undetermined mix of Basic Rate Interface and Primary Rate Interface lines. Applications supported will include high-speed facsimile, desktop computer conferencing, automatic number identification, data base inquiries and local network bridging.

Who will pay?

Originally, the New York PSC suggested that users and network providers share the cost of implementing the network and its services. The New York State Consumer Protection Board (CPB) opposed that position on the grounds that carriers were already pursuing ISDN trials and that ratepayer subsidies to common carriers would give the carriers an advantage over competing ISDN activities.

In the wake of the CPB's protest, the New York PSC has decided to wait until November — after the carriers have provided detailed cost information — to decide the issue of cost recovery.

Trial services that are not currently offered on a tariffed basis will be free for trial customers. However, participants will likely pay for any services included in the trial that are currently available but not classified as ISDN services.

The report also expressed concern that the ongoing strike by 38,000 employees of New York Telephone could push back network implementation deadlines. The strike had not been settled as of press time.

> The PSC has decided to wait until November to decide on the issue of cost recovery.

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In Phase 1 of the project, Alltel New York, Inc., MCI Communications Corp., New York Telephone and Northern Telecom, Inc. will collaborate in developing a New York City-to-Jamestown ISDN link.

That network will employ Northern Telecom's DMS-100 and DMS-200 switches.

(continued on page 14)

Canada court ruling to spur telco options

Canadian Supreme Court decision is seen as a boost for alternative carriers, private net users.

By Jim Brown
Senior Editor

OTTAWA — The Canadian Supreme Court has handed down a landmark decision that is expected to spur competition in the Canadian telecommunications market and make it easier for users — including U.S. companies with Canadian operations — to operate private networks in Canada.

The Aug. 14 ruling allows the Canadian federal government to draft a single set of regulations governing telecommunications companies. Currently, the federal government can only grant alternative carriers the right to operate in three of Canada's 10 provinces and two territories.

To offer services in other parts of the country, alternative carriers must be sanctioned by the provincial governments. The federal government favors competition, but provinces that own telephone companies operating within their borders do not.

That makes it difficult for vendors to offer uniform services throughout Canada and forces private network users to deal with varying, and sometimes conflicting, rules in each province and territory.

For example, seven of Canada's provinces allow users to purchase customer premises equipment from any supplier. Two provinces force users to lease customer premises equipment from the telephone company, while the other province is moving to lift its restrictions on customer premises equipment ownership. Each province also has varying rules on the types of services that can be offered.

A single set of regulations would make it easier for users to buy equipment and obtain identical services in each province.

"If this ruling leads to a policy being set at the federal level, it's going to benefit all users of the Canadian telecommunications system," said Brian Moir, legal counsel for the International Communications Association. He said U.S. users have been complaining about the complicated

(continued on page 13)

WASHINGTON UPDATE

BY ANITA TAFF

NATA signs on with Telesphere International. The North American Telecommunications Association (NATA), based in Washington, D.C., last week announced it had signed a five-year agreement to sell long-distance services provided by Telesphere International, Inc. Member companies will receive a commission on the direct-dial, WATS, T-1 and packet-switching services they sell. The agreement does not cover other Telesphere offerings such as operator and pay phone services.

NATA's members, which sell communications equipment such as private branch exchanges, typically help users order telephone lines but generally do not receive a commission for the service order.

Edwin Spievack, president of NATA, said the equipment vendors will continue to help customers interconnect their equipment to any carrier they choose. But NATA members will now be able to present users with information on the alternative carrier "to help them make more rational decisions about telecommunications," he said.

If all aspects of service are equal — billing accuracy, quality of service, timely installation — customers will want to choose a carrier based on cost, Spievack said. Both Spievack and Nick Jent, senior vice-president of sales and marketing at Telesphere, claimed that the cost and performance of Telesphere's all-digital, all-fiber network is equal to or better than the technology of its competitors.

Jent also claimed the company has remedied billing and financial problems that have plagued it in the past. Although the company has not been profitable since 1982, Jent said Telesphere became profitable within the last 90 days and

(continued on page 14)

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Canada ruling spurs telco options

continued from page 11

customer premises equipment rules in different provinces.

They have also complained about the conflicting rules in each province that define how users can attach to the network and the types of services network circuits can be used to support.

"A lot of that confusion could be negated or eliminated with federal policy or standards," Moir said.

The ruling is also a feather in the cap of CNCP Telecommunications, which is trying to win wider rights to compete against Telecom Canada.

A nonprofit association comprising Canada's nine telephone companies, Telecom Canada establishes policies and technical standards for the country's telephone network and coordinates nationwide service acquisitions for users.

But members of Telecom Canada are regulated separately, some by the federal government and some by provisional governments.

"What this means is that the [federal] government has the capability of implementing a national policy on telecommunications," said George Harvey, CNCP Telecommunications' president and chief executive officer. "We regard it as a major step forward. If we are to compete, we need a national policy whereby we can offer our services on an equal basis in all provinces."

CNCP Telecommunications already has approval from the Canadian Radio-television and Telecommunications Commission (CRTC) — the equivalent of the U.S. Federal Communications Commission — to offer alternative leased-line voice and data services in Quebec, Ontario, British Columbia, the Northwest Territories and the Yukon Territory.

The CRTC declined comment on the ruling, which analysts say could clear the way for CNCP Telecommunications to begin offering alternative services in Newfoundland, Nova Scotia, New Brunswick and Prince Edward Island. However, the ruling leaves doubt as to whether CNCP Telecommunications will be able to compete against provincial government-owned telephone companies in Alberta, Saskatchewan and Manitoba, which appear to be exempt from federal rule.

The CRTC establishes rates for interprovincial long-distance services and has set CNCP Telecommunications' rates at 10% to 15% less than Telecom Canada's. Rates for traffic within a province are set by provincial utility boards.

CNCP Telecommunications said it will ask the CRTC later this year for approval to offer dial-up voice services in addition to the dial-up data services it already offers. The CRTC refused CNCP Telecommunications' application to offer voice services in 1985 because it felt the firm's business plan was not feasible.

"We're going to be the [William] McGowan and MCI [Communications Corp.] of Canada," Harvey said.

Last week's ruling stems from a 1982 court case in which Alberta Government Telephone (AGT) argued that the CRTC had no power to act on CNCP Telecommunications' application to offer leased-line services in Alberta. In its recent decision, the Supreme Court unanimously ruled that the CRTC can regulate telephone companies that provide service among provinces, which AGT does. However, the Supreme Court ruled 4-1 that Canadian law prohibits the federal government from regulating provincially owned companies.

Analysts say letting the federal government decide where alternative carriers can offer service will spur competition. "In time, there will be more choices for telecommunications services everywhere as the provinces are forced into providing standard interconnects to other companies," said Ellen Koskinen-Dodgson, principal with Telecommunications Management Consultants, Inc. in Vancouver.

Others said the ruling will help clear up Canada's confusing regulatory scene. "In Canada, there is no single telecommunications regulation environment," said Ian Angus, principal with Angus TeleManagement Group, Inc., a consulting firm in Pickering, Ontario. "Among the business community, there is a lot of sentiment for a single regulatory environment." ☑

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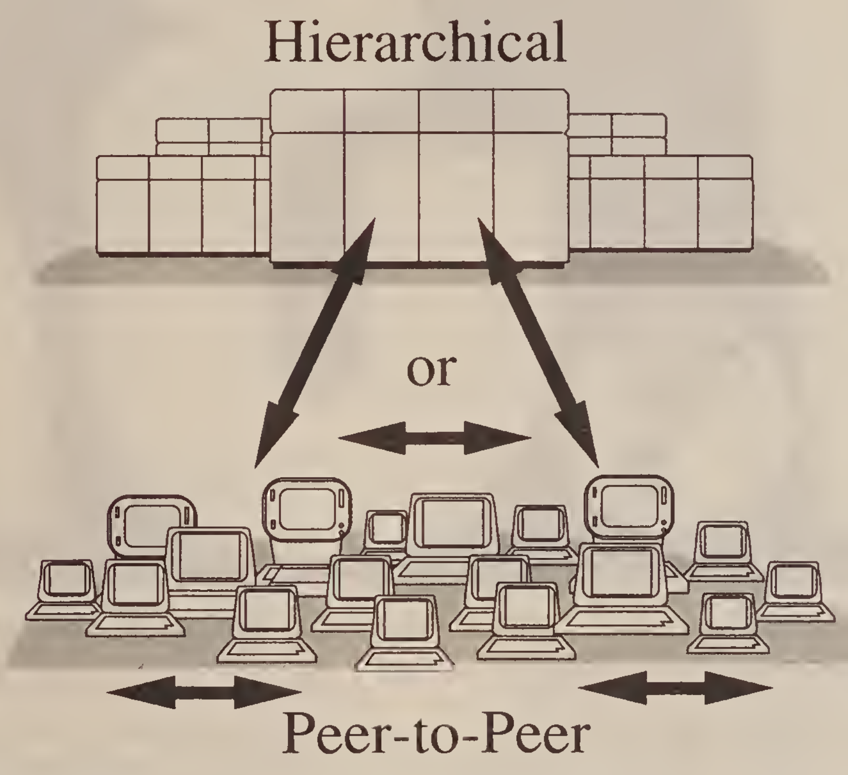

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Communications

Washington Update

continued from page 11

expects to finish the year in the black.

This is the first such agreement between NATA and a long-distance company, although the association already has sales arrangements with local telephone companies. Spievack said the group had been negotiating with other carriers but has failed to work out sales agreements.

AT&T files PPNS tariff. In an effort to boost usage of its Private Packet Network Service (PPNS), AT&T last week filed a promotional tariff with the Federal Communications Commission that would waive certain onetime charges for the service. For customers that sign up for a one-, three- or five-year term, AT&T will waive the charge for packet-switching units, packet-switch unit connections and the customer network control system capability.

PPNS must be ordered between Sept. 5 and Dec. 5, and installation of the service must be completed by March 5. If a customer terminates service before the end of its contract term, AT&T will bill for the waived charges.

In its filing, AT&T said it expected to generate $11,200, with a profit of $9,500, during the first year of the promotion.

Because it will show a profit during the first year, AT&T said the promotion meets the rules established under price cap regulation.

AT&T told the FCC that the promotion would take some business away from its voice-grade and Dataphone Digital Service but that the impact would be minimal.

AT&T cuts Canadian rates. AT&T also filed a rate reduction of 8% for its international services to Canada. The cuts are scheduled to take effect Oct. 5. AT&T told the FCC it hopes to capture some of the increased business communications spurred by the U.S.-Canada Free Trade Agreement, which was signed earlier this year.

In addition to the across-the-board cuts, AT&T is proposing volume discounts for the service — 5% for monthly charges between $50 and $350; 10% for charges between $350 and $1,350; and 15% for charges of more than $1,350.

Rates for AT&T's Canadian service are based on both distance and usage.

Rate cuts deferred. AT&T had to defer the effective date of proposed rate reductions for its T-1 and T-3 services last week when the FCC's Common Carrier Bureau asked for more time to study the price plan. The tariff, which proposes rate reductions of as much as 60% over current month-to-month rates, was scheduled to take effect last week. The new effective date for the rate reductions is Sept. 1. ◻

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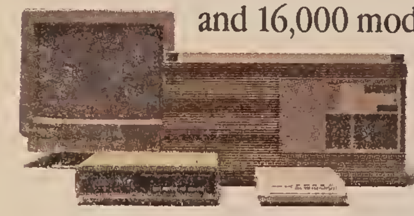

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New York PSC details ISDN plan

continued from page 11

Rochester and New York City will be linked by a network implemented by AT&T, New York Telephone, Rochester Telephone Corp. and Teleport Communications. That network will use AT&T's 4ESS and 5ESS switches.

Testing of the New York-to-Jamestown ISDN link will begin in the first quarter of 1990, according to the commission's timetable, while the New York-to-Rochester connection will begin operating in the third quarter of 1990. Testing will be completed between the first and third quarters of 1991.

Specific details have yet to be finalized.

The two-phased approach will allow the two networks to evolve and be interconnected as ISDN standards develop.

Potential trial customers were selected from the customer bases of Alltel, New York Telephone and Rochester Telephone. Ceddia said one large potential customer is close to making a commitment to the project and that negotiations are taking place with other companies. Customer selection will be finalized this month.

Though Ceddia would not disclose any of the prospective users, large companies with operations in Jamestown include IBM and Cummins Engine Co., Inc. Large firms operating in Rochester include Eastman Kodak Co. and Xerox Corp. ◻

DATA COMMUNICATIONS

PRODUCTS, SERVICES, ARCHITECTURES, STANDARDS AND NETWORK MANAGEMENT

Worth Noting

"ISDN Compatibility in Networking T-1 Multiplexers," a recent report from Distributed Networking Associates of Greensboro, N.C., outlines how six T-1 multiplexer makers intend to support ISDN. The vendors studied are General DataComm, Inc., Network Equipment Technologies, Inc., Newbridge Networks, Inc., Teleos Communications, Inc., Tellabs, Inc. and Teltrend, Inc.

Data Packets

Larse Corp. last week said its forthcoming Integra-T Network Management Workstation and its LarScan fault alarm system will support AT&T's Unified Network Management Architecture (UNMA).

The products will support AT&T's Accumaster Integrator, a software program that translates a vendor's proprietary network management data to a UNMA format and forwards the data to an Accumaster workstation. Support for UNMA will enable an operator to control both Integra-T and LarScan from a single workstation.

The Sun Microsystems, Inc.-based Integra-T Network Management Workstation, which is currently in development and expected to ship in early 1990, will monitor and control Larse's line of T-1 Network Diagnostic System channel service units. The LarScan family of products consists of devices that attach to things such as fire alarms, security alarms and private branch exchanges, enabling a central-site microcomputer or minicomputer to monitor for alarms.

(continued on page 20)

India hopes new VSAT net will lure U.S. businesses

Net to ease communications with remote sites.

By Tom Smith
New Products Editor

SIKANDRABAD, India — The government of India recently announced plans to install a very small aperture terminal satellite network that is expected to attract U.S. businesses to the country by providing a better means to communicate with remote areas.

The Remote Area Business Message Network, purchased by India's Department of Telecommunications, will replace unreliable terrestrial lines used to link remote buisnesses to metropolitan offices. In the country's most isolated areas, the net could eliminate reliance on couriers.

> In the country's most isolated areas, the net could eliminate reliance on couriers.

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"We have a lot of establishments working in remote, inaccessible areas, where communications facilities are not adequate," said Ram Manohar, director of the Remote Area Business Message Network. "Installing VSATs is a relatively inexpensive way to provide communications to those places."

The lack of reliable data services has discouraged some U.S. businesses from establishing Indian operations, according to Indu Singh, president of Telecon International, a Burke, Va.-based consultancy. The net will help companies with operations in India, and it could entice other U.S. firms to set up shop there.

In 1988, the government's National Informatics Center (NIC) implemented a satellite net, dubbed NICNet, for the exchange of data between the federal government and the nation's smaller governing bodies. The success of that net was one motivating factor behind the Department of Telecommunications' decision to employ satellite technology.

The department's VSAT network will be managed by Equatorial Pacific International Co. (EPIC), a firm partly owned by Contel ASC of Rockville, Md.

The department has ordered 1,000 of Contel ASC's DMN 2000 VSATs from ITI Equatorial Satcom Ltd., a joint venture between EPIC and Indian Telephone Industries, Ltd., a government-owned provider of telecommunications equipment. The government is ordering the satellites for users.

(continued on page 20)

NetView/PC application automates line restoral

By Jim Brown
Senior Editor

PARAMUS, N.J. — Control Resources Corp. recently announced an IBM NetView/PC application that enables users to automate the procedure for establishing dial-up links to replace failed leased-line connections.

The NetView/PC application, which will replace a proprietary microcomputer program previously used to control the company's Intelligent Dial Backup System (IDBS)/Blue product, will make it possible to pass alarms to a NetView console.

The company's NetView/PC application runs with NetView/PC Version 1.1 on an IBM Personal Computer attached to the IDBS chassis.

The chassis supports as many as 192 four-wire private lines and as many as 96 two-wire dial-up lines, each of which can operate at speeds up to 19.2K bit/sec.

The application converts proprietary IDBS alarms to NetView alerts when leased lines fail or when operational faults develop. Once converted into the NetView format, the data is forwarded to an IBM mainframe-based NetView network management console.

Under NetView control

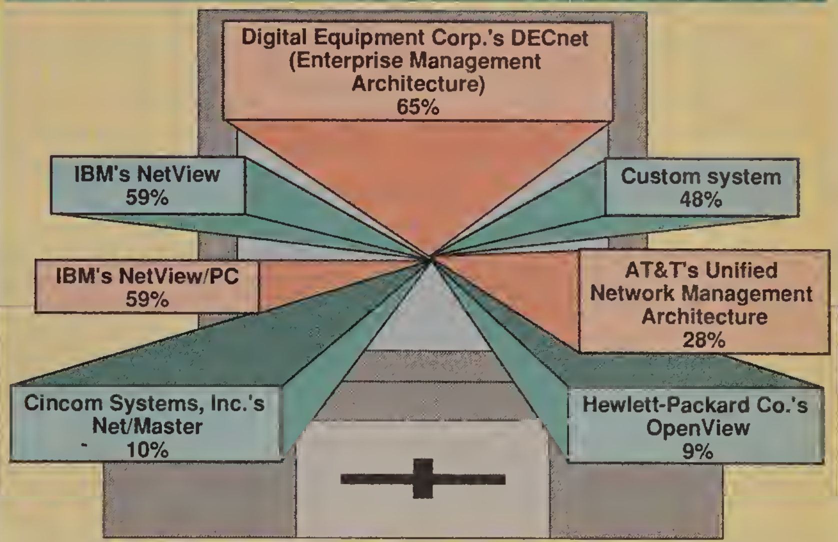
By bringing control of IDBS under NetView, customers can use NetView's automated command lists (CLists) to build automatic responses to IDBS alerts.

These CLists, for example, can identify alerts concerning the failure of a remote modem and can automatically issue the IDBS commands needed to establish a dial-up replacement link.

Control Resources' current microcomputer-based manage-

(continued on page 16)

Net management support trends



A survey of 150 users asked respondents to classify which network management systems they want third-party suppliers to support. Respondents were free to indicate more than one net control package.

GRAPHIC BY SUSAN SLATER

SOURCE: INFONETICS, INC., SANTA CLARA, CALIF.

Users applaud IBM's third-party approach

Company's alliances with NetView tool suppliers seen as 'quick fix' for net management system.

By Paul Desmond
Senior Writer

Users and analysts are applauding IBM's recent NetView announcements, saying the alliances the company forged with third-party suppliers of NetView tools will enable IBM to plug the gaps in its network management system.

Without expending its own development resources, IBM solved a nagging NetView deficiency by acquiring a graphical user interface. It also breathed new life into NetView/PC by endorsing third-party program development tools, enhancing support for private branch exchanges and taking steps to bring Unix net management systems under the NetView umbrella.

"I think it's a positive approach," said NetView user Greg Lee, manager of Chevron Information Technology Co.'s network division in San Ramone, Calif. "There's some good ideas out there in the marketplace. To take that approach will improve their product."

Doug Weber, district manager of data networking technology for Southwestern Bell Telephone Co. in St. Louis and a NetView user, agreed with Lee. "They are realizing where pockets of expertise lie and are aggressively pursuing that expertise to develop solutions that users demand."

In keeping with its recently adopted strategy of acquiring complementary technologies, IBM's latest NetView-related announcements included one product acquisition and four comarketing agreements ("IBM's equity investments provide technology boost," *NW,* June 12). The announcements included:

- The acquisition of a personal computer-based graphical user interface to NetView from US West Network Systems, Inc. (NSI).
- A comarketing and development agreement with TSB International, Inc. for a NetView/PC application that supports PBXs from various vendors.
- A comarketing agreement with Carl Vanderbeek and Associates for its menu-based NetView/PC application generator.
- Funding to port two Unix-based network management systems — one from Applied Computing Devices and the other from International TeleManagement Corp. — to IBM's AIX operating system and to give the products a NetView interface.

> Without expending its own resources, IBM solved a nagging NetView deficiency.

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Most analysts agreed the partnership strategy is a healthy one, although some questioned why IBM did not develop products such as the graphical user interface or the NetView/PC application development kit on its own.

(continued on page 16)

Application automates restoral

continued from page 15

ment system requires operators to manually issue commands instructing IDBS to create dial backup links.

The NetView/PC application also allows customers to use their mainframes to store a data base of telephone numbers needed to reach remote modems, making it easier to build CLists.

Previously, the telephone number data base had to be stored on the Personal Computer attached to IDBS.

IDBS/Blue is installed on the digital side of private-line modems in a data center. When a primary link fails, an internal electronic crossconnect panel switches the signal to a dial line interface module.

The dial line interface establishes two dial-up links to the remote location, which has to be outfitted with a dial backup unit. The unit answers the calls and resumes communications over the link until the leased line is restored.

Pricing

A base IDBS supporting 12 leased lines, eight dial-up lines capable of supporting four remote modems, the NetView/PC interface software plus the company's proprietary management software is priced at $14,200.

Supplying the NetView/PC application and the proprietary management software enables users to choose how they prefer to manage IDBS.

Current IDBS users can purchase the NetView/PC software for $1,250.

Users applaud IBM's approach

continued from page 15

"In a number of these areas, it's a reflection of IBM's inability to get its act together internally," said Atul Kapoor, vice-president of Kaptronix, Inc., a consultancy in Haworth, N.J. "There are some good alliances, but they should have done a number of those things on their own."

But others said IBM's strategy of seeking out third parties is a boon to users because it gets products to market faster than IBM could on its own. IBM intends to continue the strategy, according to Mark Knittel, systems manager for network management at the company.

"This is a general strategy that we intend to have in place for the foreseeable future, and that's not necessarily particular to network management," Knittel said. "We tend to be faulted sometimes for wanting to do everything ourselves. This represents a chance for us to be more open and embrace the work that gets done in other places as complementary to the product we provide."

For users, the benefit of the strategy can be seen in products such as the Graphic Network Monitor (GNM) package IBM acquired from NSI. Knittel said IBM will continue to develop its own graphical user interface, which will be compliant with its Systems Application Architecture, but that it will offer GNM to satisfy users' near-term requirements.

According to James Herman, a principal with Boston's Northeast Consultancy Resources, Inc., IBM's own graphical user interface will not be available for another year or two.

IBM has shown a similar attitude regarding PBXs. IBM previously only supported IBM/Rolm Systems Division PBXs and CBXs under NetView, but the TSB International package adds support for most major PBXs.

"This shows that IBM does not have the attitude that they have all the answers," Herman said. "They know they need to use approaches and technologies other vendors have to offer."

"It's almost like it's an overpowering corporate philosophy within IBM," agreed Frank Dzubeck, president of Communications Network Architects, Inc., a consultancy in Washington, D.C. "You're seeing the realization that they don't literally make everything; they can't. So you're seeing them become a benevolent integrator."

But the IBM alliances can also be viewed as defensive moves on IBM's part, Herman said. IBM may have bought the graphical user interface product to prevent a competitor such as Cincom Systems, Inc. from buying the product and using it as a tool against IBM. Cincom makes Net/Master, the chief competitor to NetView for managing Systems Network Architecture networks.

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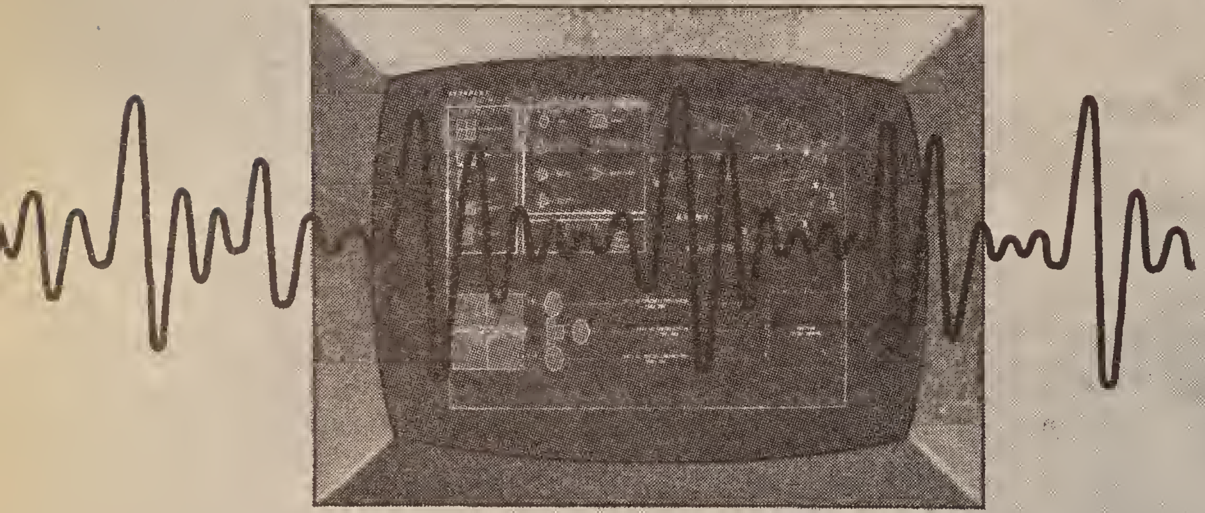

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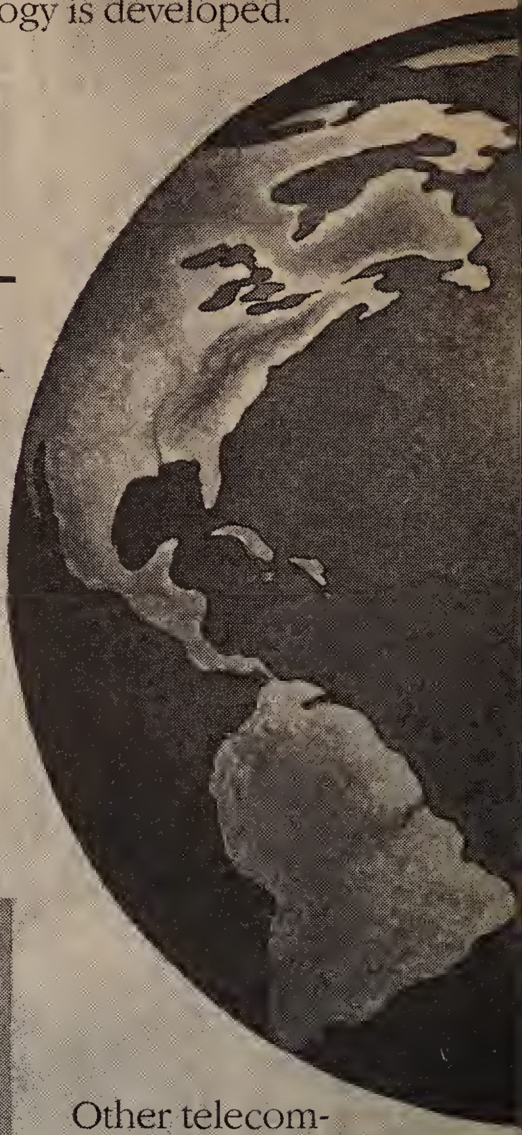

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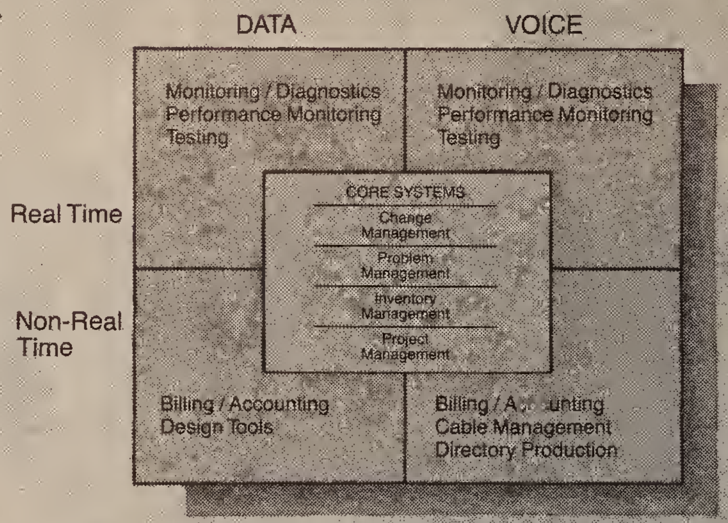

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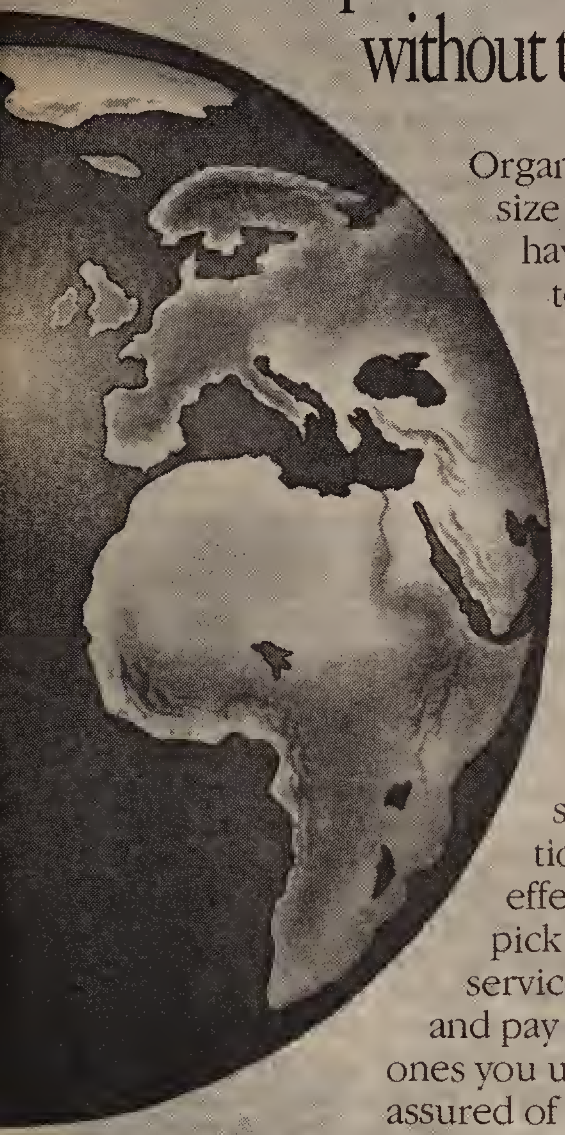

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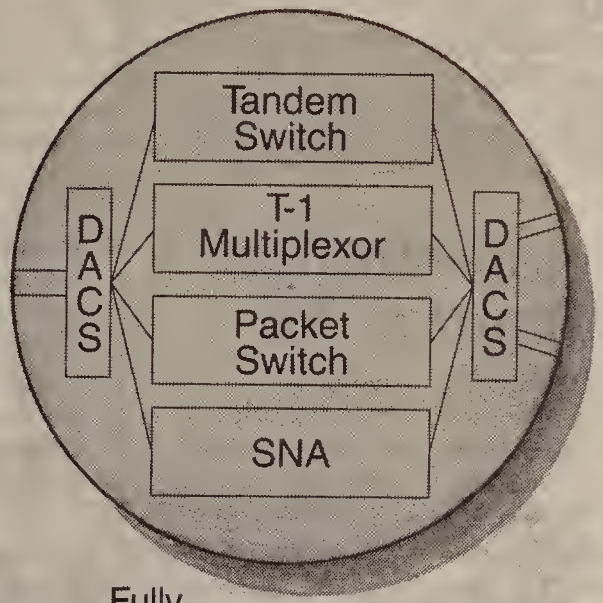
- Service Bureau processing
- Data base design and creation



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You can be sure... if it's Westinghouse

Communications

Data Packets

continued from page 15

EurOSInet, a group of vendors that promotes the use of Open Systems Interconnection standards, recently announced plans for what it says will be one of the largest OSI demonstrations to date. The demonstration will be held at the CeBIT '90 Exhibition in Hannover, West Germany, next March.

With the help of OSITOP, a group of users promoting OSI standards, more than 40 companies are expected to demonstrate products that provide interconnections between systems made by various vendors.

The vendors intend to use X.400 to exchange electronic mail messages; File Transfer, Access and Management to trade files; the EDI for Administration, Commerce and Transport (EDIFACT) standards to exchange electronic data interchange documents; and X.500 to support an E-mail directory service.

EurOSInet has the support of the Commission of European Communities. It also recently agreed to team with Australian-based OSIcom, North American-based OSINET, Japan-based INTAPnet and Singapore-based OSNET to form a single organization called OSIone in 1990. OSIone will promote OSI standards worldwide. Currently, all five groups promote OSI in their own regions.

Racal-Vadic last week introduced a new CCITT V.32-compatible 9.6K bit/sec modem capable of transmitting on two-wire and four-wire leased lines or dial-up lines. In addition to 9.6K bit/sec, the 9632PA can communicate with other modems that operate at 4.8K, 2,400, 1,200 or 300 bit/sec.

The modem transmits asynchronous or synchronous data in full-duplex mode and includes an automatic dial backup and restoral feature that establishes a dial-up connection to the remote site when the leased line fails.

The modem is configured via a front-panel keypad and supports Hayes Microcomputer Products, Inc.'s AT command set. It also supports Microcom, Inc.'s Microcom Network Protocol (MNP) error checking and MNP Class 5 data compression, which enables the modem to achieve a throughput of 19.2K bit/sec under optimal conditions. The 9632PA modem costs $1,595. ◼

India hopes VSAT net will lure U.S. business

continued from page 15

A dedicated 11-meter, $6 million hub at the department's master earth station complex here will anchor the network. The hub will support data requests from remote sites at 1,200 bit/sec and responses at 9.6K or 19.2K bit/sec.

Airlines will use the network, for example, to provide flight information to remote travel agency offices, Manohar said.

Another key application sought by the government is transmission of telex messages among businesses, according to Andy Paul, senior director of international sales and marketing for Contel ASC.

The Department of Telecommunications currently has orders for 550 of the 1,000 1.2-meter VSATs, according to Manohar, who said businesses that apply will pay for hardware, as well as a usage fee and a monthly fixed charge. The department plans to cut over the net by December.

"Such a network would allow us to bypass the bad conditions and bottlenecks of terrestrial links within India," said Naren Patni, president of Data Conversion, Inc. of Cambridge, Mass. Patni is a founder of Patni Computer Systems, Ltd., which has 10 offices in India via a joint venture with Data General Corp. Patni, though unaware of the department's plans, said his firm would be most interested in the net.

"The advent of an intracountry network would enable us to more effectively reach our community of interest," said Harry Williams, manager of worldwide network planning with NCR Corp.'s Corporate Telecomputing Services Division. NCR has six locations in India.

In a country that relies heavily on microwave technology and provides less than half of its 800 million people with access to telephone service, a VSAT network is a significant step toward modernization in the business arena, Telcon International's Singh said. Moreover, with an estimated 200 million affluent, highly educated citizens, the country represents a very lucrative market for U.S. firms, he added.

The network could eventually be linked to international public VSAT networks, which Singh predicted will be the next significant development in satellite technology. Such networks could replace the leased lines and underwater cables currently used by U.S. businesses for communications with India. Moreover, they could offer an alternative to international private satellite nets.

Texas Instruments, Inc. operates a satellite network linking more than 20 international sites, according to Blair Sanders, a project manager for TI's Information Systems and Services Division.

As part of the network, TI's software development operation in Bangalore, India, communicates with TI headquarters in Dallas using a 64K bit/sec C-band satellite link.

If the Department of Telecommunications' network eventually became a gateway for access to an international public satellite link, it could translate into reduced costs for TI. "We'd be interested in looking at that from a cost-saving point of view," Sanders said.

Patni Computer Systems and DG are currently mulling over a private satellite network linking operations in India and the U.S. Linking the department's network to an international public network could be an alternative to the projected $400,000 needed annually to run a dedicated network, Patni said. ◼

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LOCAL NETWORKING

PC AND TERMINAL-TO-HOST LANS, GATEWAYS AND MICRO COMMUNICATIONS PRODUCTS

Worth Noting

"I don't think LANs can be considered recession-proof anymore. They are now budgeted as capital equipment, and companies that sell them are going to be affected by a slowdown in capital spending."

Alice Bradie
Senior technology analyst
Hambrecht & Quist, Inc.
San Francisco

Netnotes

Emerald Systems Corp. last week said it plans to offer a 4mm digital audio tape storage subsystem for Novell, Inc. NetWare local networks.

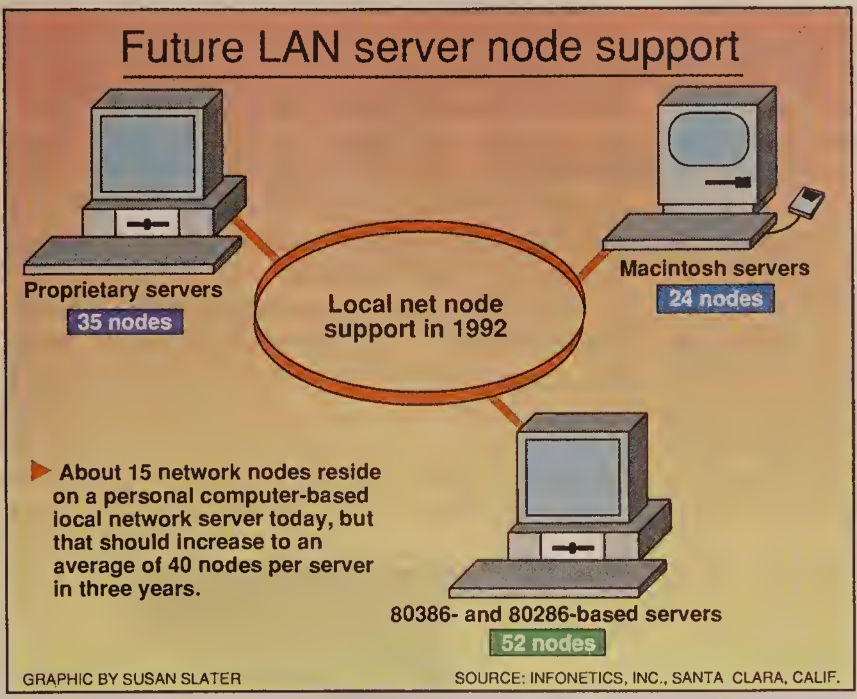
The product, to be called RapidRecover 1.2, is a tape backup unit with 2.2G bytes of storage. It will be marketed against smaller 300M-byte backup units that are typically linked together over a local network. The tape unit will support all NetWare versions.

RapidRecover 1.2 is scheduled to ship in the fourth quarter of this year; the unit will cost $6,995.

Consumers Software, Inc. recently announced PC Postoffice 2.0, a portable software package that runs on a laptop or regular personal computer and lets a user dial in to a home office to retrieve electronic mail.

PC Postoffice 2.0 receives and stores E-mail, and forwards messages to their intended destinations. Users can configure the system to hold the mail at the home office until the user requests it or have it automatically forwarded to a remote site. The software can also be configured to send mail in batches during any selected time period.

PC Postoffice 2.0, available now, has two components. PC Postoffice for the home office hub is priced at $495, and Remote User 2.0 for remote personal computers or laptops costs $95. ◻


Future LAN server node support

Proprietary servers
35 nodes
Local net node support in 1992
Macintosh servers
24 nodes
80386- and 80286-based servers
52 nodes

▶ About 15 network nodes reside on a personal computer-based local network server today, but that should increase to an average of 40 nodes per server in three years.

GRAPHIC BY SUSAN SLATER

SOURCE: INFONETICS, INC., SANTA CLARA, CALIF.

Future holds bigger LANs, RISC-based superservers

Number of LAN servers is expected to double.

By Sarah Vandershaf
West Coast Correspondent

SANTA CLARA, Calif. — Greater availability of applications and growing recognition of the productivity gains offered by local nets are driving users to expand their use of the technology, according to a recent survey.

The report, "LAN Servers: User Requirements and Buying Plans," by Infonetics, Inc., is based on a survey of top MIS and network executives from 100 large companies. It shows that most users plan to significantly expand their local nets by adding more workstations and servers.

"LANs have become an accepted technology," said Nina Burns, a vice-president with Infonetics, a consulting firm based here.

Survey respondents indicated they plan to increase the average number of personal computers supported by each net server from 15 to 40, and to double the number of servers per local network from almost two today to four by 1992.

According to the survey, Intel Corp. 80286- and 80386-based personal computers will be the servers of choice, and each will support an average of 52 users by 1990.

Adding more users

Proprietary servers, such as those from Novell, Inc., 3Com Corp., Banyan Systems, Inc. and Digital Equipment Corp., will support roughly 35 users apiece. Today, most personal computer-based servers support only 15 users, Burns added.

By 1990, dedicated Macintosh servers will support 24 users each, she said, mainly because there are fewer networked Macintoshes than there are networked DOS-based computers.

Burns said that while many users will try to boost network capacity by upgrading to an 80386-based server, the move may not be effective. "The CPU is not the only bottleneck. Network managers will run into problems mainly with I/O, disk storage and speed."

As more users are brought onto a local net, they contend for disk access with other users, resulting in data access delays. In addition, the emergence of high-speed interface cards could strain the network because they demand information from a storage subsystem faster than it can be put on the network.

Some users may alleviate this bottleneck, Burns said, by adding more servers and storage subsystems.

Class distinctions

Burns predicts that a new class of servers, which she calls superservers, will emerge that can simultaneously handle several applications at once, including file, data base and electronic mail service.

Superservers will be based on Reduced Instruction Set Computer microprocessors and will sport multiple processors, unlike other servers. They will also cost a fraction of what minicomputer and mainframe servers cost.

Dedicated personal computers will likely be used as low-end microservers, supporting one specialized function only. According to Burns, a single network in the future may have a mix of microservers and superservers.

"LAN Servers: User Requirements and Buying Plans" is available for $4,500 from Infonetics by writing to 3235 Kifer Road, Suite 100, Santa Clara, Calif. 95051, or by calling (408) 746-2500. ◻

Quarterdeck eases RAM cram in net PCs

Company's QRAM software frees up extra main memory for PCs to run additional applications.

By Susan Breidenbach
West Coast Bureau Chief

SANTA MONICA, Calif. — Quarterdeck Office Systems, Inc. last week introduced software that gives DOS-based computers on local networks more memory for running applications.

QRAM — pronounced cram — is a DOS memory manager for IBM Personal Computers, XTs and ATs equipped with expanded memory that lets users move net software drivers out of main memory into so-called "high memory" above the traditional DOS 640K-byte barrier.

By moving some of the networking software out of memory between 0 and 640K bytes, users of Quarterdeck's Desqview — a multitasking windows environment for DOS — can allocate more memory for applications. That means Desqview users can create larger applications windows for running spreadsheets, data bases and other memory-intensive applications.

"Networking and multitasking go hand in hand," said Therese Myers, president of Quarterdeck. "We developed QRAM to save the 8088 [-based computers] in the network environment."

The software actually lets users load local network software drivers into high memory, easing the random-access memory squeeze in which memory-resident programs eat up precious processing memory.

QRAM requires expanded memory compatible with the Expanded Memory Specification 4.0 or the Enhanced Expanded Memory Specification. Scheduled for release in October, it is priced at $59.95 per workstation.

Quarterdeck announced QRAM at its second annual Desq-

(continued on page 22)

Novell ups NetWare prices, bundles Mac, OS/2 wares

By Laura DiDio
Senior Editor

PROVO, Utah — Novell, Inc. recently raised prices by as much as 15% on most NetWare versions and said it will bundle NetWare for Macintosh and its forthcoming NetWare Requester for OS/2 in future shipments of the net operating system.

By packaging these programs into NetWare, Novell will become one of the few vendors to support MS-DOS, OS/2 and the Macintosh workstations under the same network operating system.

Novell said it hiked prices by $300 each on Advanced NetWare, System Fault Tolerant (SFT) NetWare and ELS NetWare Level II because it will increase the products' functionality with the addition of the Macintosh and OS/2 programs.

NetWare Requester for OS/2 will enable OS/2 workstations on a NetWare net to run distributed OS/2 applications ("Software lets Novell users support OS/2 applications," *NW*, July 31).

Even with the price increase, users will still pay $100 less than if they purchased NetWare for Macintosh Version 1.1 and NetWare Requester for OS/2 separately, according to Ed Cooper, Novell's senior director of marketing for NetWare products.

Advanced NetWare now costs $3,295, an increase of 9%, while SFT NetWare has been increased 6% to $4,995, and ELS NetWare Level II now costs $1,895, a 15% hike.

The only version of NetWare not affected by the new pricing is the four-user version of ELS NetWare Level I Version 2.0a, Cooper said. The list price for that version remains $695.

When the last of the existing distributor stock is sold — probably within the next 30 days — NetWare users will no longer have the option of purchasing Advanced NetWare, SFT NetWare and ELS NetWare Level II without the bundled Macintosh and OS/2 support, Cooper said.

Not slighting users

Cooper emphasized that Novell is not slighting users by forcing them to accept Macintosh and OS/2 support whether or not they need it.

"Most users are already requesting multiclient support, especially for Macintoshes. User demand [for OS/2 and Macintosh support] is one of the reasons we decided to bundle those options into NetWare," Cooper said.

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Quarterdeck eases RAM cram in net PCs

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view Developers' Conference here. Users attending the event said they expected the product to bring them some welcome relief from what they called RAM cram.

John Garman, associate director of information systems planning at the National Aeronautics and Space Administration's Johnson Space Center in Houston, said he had some DOS workstations that were attached concurrently to a Novell, Inc. NetWare network, an IBM mainframe and a Digital Equipment Corp. VAX. Desqview lets users move between IBM 3270, VAX and DOS sessions; however, fitting all the associated emulation and network software into a window, along with an application of any size, is a major challenge.

Jeffrey Pulver, president of Spreadsheet Solutions Co. of Garden City, N.Y., develops add-on programs for Lotus Development Corp.'s Lotus 1-2-3. His company recently released a Desqview application called @Fixed Income that runs in a dedicated applications server on a local network. The application pulls data off information services or internal sources in real time and plugs it into Lotus 1-2-3 spreadsheets running under Desqview on personal computers used by traders.

"The announcement of QRAM will be well received by the people installing our nets," Pulver said. By freeing up conventional memory, QRAM will give the firm's users more space for larger spreadsheets.

GE Information Services of Rockville, Md., is also developing Desqview-based application servers for local networks. The General Electric Co. division is using the servers to build distributed applications that run across its public data network.

The company, for instance, is developing a custom dBase application for a large insurance company that has multiple branch offices and agents scattered around the country. Application servers running dBase act as a store-and-forward interface between the different types of local networks at the various sites and GE Information Services' public network.

"The QRAM introduction is very significant to our users," said Frederick Hitt, a senior microcomputer consultant at GE Information Services.

Thanks for the memory

At the conference, Quarterdeck also introduced Version 5.0 of its QEMM-386 and QEMM-50/60 memory managers, which shut off a workstation's extended memory and direct data into an expanded memory add-on board.

The company also rolled out a diagnostic utility called Manifest, as well as Desqview application program interface (API) libraries for programmers who want to develop Desqview applications with Basic, Ashton-Tate Corp.'s dBase or Nantucket, Inc.'s Clipper, a dBase compiler.

QEMM-50/60 supports IBM's Memory Expansion Option, Expanded Memory Adapter/A and compatible Micro Channel memory boards. Version 5.0 will include a QRAM-like feature, letting users load network drivers and other programs into high memory to maximize the amount of conventional memory below 640K bytes for applications. Also available in October, it is priced at $99.95.

Manifest, which is included in QRAM and Version 5.0 of QEMM-386 and QEMM-50/60, is a tool users can employ to examine memory and determine how it is being used by DOS, system components and application programs and devices.

The three new API libraries join Quarterdeck's two existing Desqview development tools for C and Pascal programmers. The Basic, dBase and Clipper libraries are available now and cost $149.95 each. ◘

Novell ups NetWare prices, bundles wares

continued from page 21

Even small users with less than 10 nodes on their nets are beginning to experiment with OS/2-based workstations on their NetWare nets, and they want the OS/2 Requester, he added. According to Cooper, most of Novell's installed base has OS/2 and Macintosh systems at their sites.

Current NetWare users will be able to upgrade their existing networks to support NetWare for Macintosh Version 1.1 value-added process (VAP) or the NetWare Requester for OS/2, Cooper said.

3270 upgrades

Novell also added new enhancements to its line of NetWare SNA Gateway software. The NetWare SNA Gateway is software that resides either on a dedicated workstation or on a server positioned as a gateway. It enables NetWare users to communicate with an IBM mainframe by emulating an IBM 3270 terminal.

Novell has enhanced NetWare SNA Gateway with improved performance, enhanced network management capabilities and a Synchronous/V.35 Adapter board that provides users with remote Synchronous Data Link Control connectivity to IBM 3270 systems at speeds up to 64K bit/sec.

Novell boosted the performance of NetWare SNA Gateway Version 1.1 by reducing workstation memory requirements by as much as 28% to 40% over the previous version.

This enables users to devote workstation memory to applications rather than system overhead and, in some cases, boosts gateway performance by as much as 400%, according to Gerry Machi, director of product marketing for Novell's Communications Products Division.

The company added a local network utility that enables net administrators to conduct both local net and host net control functions from one software screen.

The Novell Synchronous/V.35 adapter option costs $595. ◘

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MANAGEMENT STRATEGIES

MANAGING PEOPLE AND TECHNOLOGY: USERS GROUPS AND ASSOCIATIONS

Worth Noting

Last weekend, US Sprint Communications Co. was scheduled to begin customer tests of the Private Trans-Atlantic Telecommunications-1 undersea fiber-optic cable. Participating in the tests are the New York brokerage firms Goldman Sachs & Co. and Morgan Stanley & Co., which each have contracted for one T-1 link on the cable.

Association Watch

The **Communications Managers Association (CMA)**, a New York-based users group, has scheduled its next educational meeting in Manhattan, N.Y., on Sept. 13.

The featured speaker will be Barry Tanner, senior consultant at the New York-based Electronic Systems Association. Tanner's address is entitled "Telecommunications Cable and You: Shotgun Marriage or Wedded Bliss?" Also speaking are Lee Selwyn, president of the Boston-based consultancy Economics and Technology, Inc., and James Blaszak, partner in the Washington, D.C. law firm Heron, Burchette, Ruckert & Rockwell and legal counsel to the Ad Hoc Telecommunications Users Group. For more information, call (201) 766-3824.

The **Bynet Users Group**, for customers of the Southborough, Mass.-based matrix switch maker Bytex Corp., will hold its second annual meeting in Framingham, Mass, Sept. 13 to 15.

Forty users attended last year's inaugural meeting, according to a Bytex official, and attendance is expected to be up this year. He said the meeting will feature an open dialogue between Bytex executives and their customers.

For more information, call Bytex at (508) 480-0840. ◼

U.K. issues guidelines for preparing EDI documents

Standards aid in compliance with tax regulations.

By Wayne Eckerson
Staff Writer

VANCOUVER — In response to surging electronic data interchange use, government authorities in the U.K. have issued guidelines detailing how companies should prepare EDI documents for tax purposes.

The computer interchange guidelines, issued by the U.K.'s H.M. Customs and Excise department, are designed to help government tax auditors work with EDI records, according to Ben Wright, a lawyer specializing in electronic communications issues. Wright spoke before the first International Congress of EDI Users held here recently.

Wright said the guidelines also give companies official sanction to use EDI. For example, most countries have rules and regulations written prior to the widespread adoption of EDI that require use of paper documents with written signatures. As a result, many companies that implement EDI systems unwittingly violate government rules.

"This is the first time any country has imposed guidelines governing the use of EDI for tax purposes so it's an important precedent," Wright said.

Tax guidelines

The U.K., like many other European countries, imposes a value-added tax on the sale of manufactured goods. Traditionally, this tax is calculated from the price and quantity of goods listed on a paper invoice.

But invoices generated via EDI pose problems for tax auditors who may not know how to read electronic documents or are unable to locate the appropriate information on a system they haven't been trained to operate, Wright said.

Realizing these problems, H.M. Customs and Excise issued several guidelines for EDI business users.

(continued on page 26)

EXECUTIVE BRIEFS

Management skills. It's no revelation that successful technical managers spend more time and energy managing employees than technology.

It's also no surprise that technical specialists need a whole new set of skills when they are promoted to managerial positions.

Fortunately, most of these skills are simple to develop and require only that a manager show a measure of decency and concern for the well-being of employees.

One of the easiest and most effective managerial skills used by managers is thanking staffers for jobs well done.

A survey by Adia Services, Inc., a Menlo Park, Calif.-based placement company, showed that almost 95% of managers interviewed said they believe that frequent thank-yous help motivate staff and reduce turnover.

Only 4% of those interviewed said a performance review was the appropriate place to pay compliments, while 1% said employees don't need to be thanked for doing jobs they're paid to do.

If thanking employees is one of the easiest things a manager can do, firing employees is probably one of the most difficult and painful. Managers generally agree that compassion and concern are important qualities to have when carrying out such an odious task.

The Adia survey showed that 38% of employers offer informal counseling and outplacement services for discharged managers. Some of the services include referrals to temporary employment services, resume updating, educational assistance and positive references.

Hired and fired. Many companies wind up firing employees who never should have been hired in the first place, according to a study conducted by Robert Half International, Inc., a San Francisco-based recruitment firm for accounting, finance and information systems professionals.

The study polled 100 executives at Fortune 1,000 companies

(continued on page 26)

MANAGEMENT PROFILE

▲▲▲

BY WAYNE ECKERSON

Employee checks a terminal at Northrop Corp.'s factory.

Northrop net ends production of paper

EL SEGUNDO, Calif. — An assembly line network used by Northrop Corp. in building the F/A-18 Hornet strike-and-fighter plane has eliminated the need for factory floor workers to handle paper documents, saving the aerospace company time and money.

The Integrated Management, Planning and Control for Assembly system (IMPCA) helped eradicate the 16,000 paper documents Northrop used in manufacturing the back end of the F/A-18 Hornet.

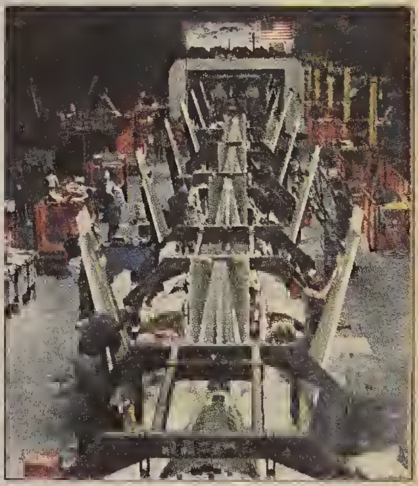
As the primary subcontractor in the aircraft project, Northrop has been building the center and rear fuselage, twin vertical tails and hydraulic, electrical and other subsystems for the F/A-18 Hornet for the past nine years. The aircraft is being used by the U.S. Navy and Marine Corps, and the air forces of Canada, Australia and Spain.

The elimination of paper means Northrop's top managers can evaluate output on the F/A-18 Hornet assembly line in two hours instead of the two days previously required. Also, IMPCA provides assembly line supervisors with better and faster updates on the performance and progress of mechanics in their area.

IMPCA will save Northrop and the U.S. Navy about $20 million through the mid-1990s, according to a Northrop official. IMPCA, which was built under a Pentagon-sponsored modernization program, took four years and $14 million to develop.

"All I used to do was holler at people looking for paper that inevitably was in somebody's pocket or briefcase," said Al Zwicker, IMPCA team supervisor. "Now we have more time to help out on the floor or plan ways to improve the system."

The IMPCA network consists of six Tandem Computer, Inc. NonStop TXP transaction processors supporting 200 terminals placed in work areas along the F/A-18 Hornet's 500-yd. assembly line here. The processors run proprietary software developed by Northrop.



Paper-free assembly line.

The software issues work orders that give mechanics step-by-step instructions for constructing an aircraft component. By logging onto the system with a secret password, mechanics can look up their daily assignments, see which work orders have been finished and sign off on work they have completed. In the same way, assembly line inspectors can use IMPCA to record whether completed work meets specifications

(continued on page 26)

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The least a local area network can give you is time for lunch.

Some food for thought.

Getting all the information from all your equipment to all your people can occupy all your time.

That's where the IBM Token-Ring Network can help.

With our new 16-megabit bandwidth, it provides remarkable new speed in moving everything from bulk data to mail to graphic images.

IBM's Token-Ring Network fits into most existing environments. It's compatible with today's popular software, connecting your workstations, including PCs and PS/2s,® midrange computers, mainframes and peripherals.

We've also designed it for reliability. With IBM software, it's easy to diagnose, isolate and correct problems, without affecting the rest of your network.

It's another reason why no other company connects more companies with more equipment to more people than IBM.

For more information on IBM local area network solutions, contact your local IBM Advanced Product Dealer or your IBM marketing representative.

We can help your entire organization run more smoothly and productively. And that means you can devote your time to other important matters.

Bon appétit.

IBM®

Net ends paper production

continued from page 23

and performance standards.

IMPCA makes it easier for management to communicate work order changes to everyone on the assembly line. Previously, work orders were contained on sheets of paper within large notebooks kept at each station on the assembly line. Changes were made by inserting new pages into the notebooks.

With IMPCA, management simply rewrites the work order on the system, giving workers the latest information when they log on. The change process, which used to take two hours and a lot of paper shuffling, now takes less than a minute, said a Northrop spokesman.

In the same way, managers can assess assembly line progress more quickly because the relevant information is stored in IMPCA rather than on separate sheets of paper that must be collected and copied each day. Using an IMPCA terminal, managers can determine the productivity of each work area and whether procedures or schedules should be adjusted. Line supervisors can also determine if mechanics are completing their orders efficiently and accurately.

Northrop spent six months training all levels of workers to use IMPCA before it was implemented in February. Early on, a demonstration system was installed on the factory floor to allow assembly line workers to become familiar with IMPCA. Prior to implementation, all mechanics received four hours of classroom training and supervisors went through eight hours of training.

The system was thoroughly tested before it was introduced on the factory floor. IMPCA terminals were then placed side by side with the notebooks, and workers were encouraged to refer to the notebooks if they had a problem using IMPCA.

"Although most of our mechanics grew up before the computer revolution, they really took to the machines," Zwicker said. "They realized the system made their jobs easier." ◼

U.K. issues EDI guidelines

continued from page 23

First, before two companies can begin exchanging trade documents, they must invite the tax authorities to witness a trial run of the EDI system, Wright said. This enables auditors to determine whether the system generates and records electronic invoices in a manner that can be easily audited.

Reliable records

Second, the government requires EDI users to implement certain controls to ensure that the system generates reliable and accurate EDI records, Wright said. For example, EDI users must retain a paper audit log that contains a brief summary of each electronic invoice and the amount of value-added tax owed to the government on each transaction. In addition, EDI users are required to keep either an electronic or paper copy of each complete invoice that a tax auditor can retrieve if needed.

Wright said the government requires companies to keep paper audit logs instead of electronic ones because it would cost too much to train auditors to read electronic systems and records.

"No one has really explored how to record EDI documents so that auditors can read them and verify their reliability," he said. ◼

Executive Briefs

continued from page 23

to determine the most common reasons for firing an employee.

The reasons include: incompetence (39%), inability to get along with coworkers (17%), dishonesty or lying (12%), negative attitude (10%), lack of motivation (7%) and failure or refusal to follow instructions (7%).

"An employer's perception of incompetence may arise from a mismatch of a candidate's professional skills and personality, and the actual requirements of the job," according to Max Messmer, chairman of Robert Half International.

He said companies should thoroughly review corporate procedures for interviewing, reference checking and job specifications in order to reduce the chances of making hiring mistakes. ◼

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ERROR-CONTROL FOR FORCES BEYOND YOUR CONTROL.

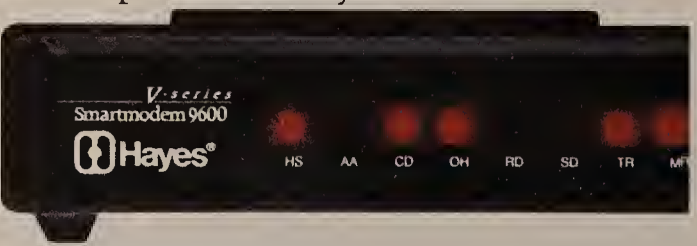
The hazards faced by your high-speed data can be truly shocking.

That's why, in addition to providing the original V-series™ error-control, Hayes V-series 2400 and 9600 bps modems now offer error-control in either international standard, V.42 or X.25.*

The V.42 protocol, for point-to-point communications, automatically detects errors and then retransmits the data correctly. While the X.25 protocol not only offers error-control but also multisession access to value added networks with expanding applications for dial-up X.25 point-to-multipoint communications.

V-series modems still provide users with data compression that can double throughput. And Hayes AutoSync for built-in synchronous communications without the added expense of a synchronous adapter card.

All to give you more control. Because with a Hayes, the only error you can make is not buying one.



Hayes®

For your nearest Hayes Advanced Systems Dealer, call 800-635-1225. Hayes Microcomputer Products, Inc., P.O. Box 105203, Atlanta, GA 30348.

*There will be a minimal charge of $50 for either an X.25 or V.42 upgrade on products purchased before October 1, 1988. Products purchased on or after October 1, 1988 will include either standard as they become available. For details call Hayes Customer Service: 404-441-1617.

Announcing the end to all your data transmission problems.

Introducing data terminating equipment from New England Telephone.

In the past, you needed two vendors to meet your data transmission needs. One for the lines. One for the ends. Leaving you caught somewhere in the middle.

But now you can get your data termination equipment from the same company who gave you your lines–New England Telephone.

Which means you get more than just reliable and accurate equipment, you get a one-vendor solution to all your data transmission problems.

Just one call to New England Telephone will take care of getting you the help you need,

with you
to finish.

quickly and efficiently. Our network is monitored 24 hours a day, seven days a week, 365 days a year–so if there's a problem, we can follow it through from beginning to end.

So contact us to order your data terminating equipment or if you need more information. And see how smoothly your data will flow when you finish with the same company you started with. Another reason we're the one for you, New England.

New England Telephone
A **NYNEX** Company

New England Telephone

A NYNEX Company

PRODUCTS & SERVICES

THE LATEST OFFERINGS FROM VENDORS AND CARRIERS

Worth Noting

See inside for:

- An E-mail gateway for linking MCI Mail and Microsoft Mail users.
- Azure's newest PC protocol analyzer.
- A V.32 modem with a proprietary data compression algorithm.

First Look

Syntax NETBIOS, TCP/IP packs bow

Syntax, Inc. recently announced Transmission Control Protocol/Internet Protocol and Network Basic I/O System client software for networked DOS-based personal computers.

Used together, the two products — dubbed **PC/TCP** and **NetBIOS** — let a personal computer become a node on a TCP/IP net using NETBIOS as a transport mechanism.

The company also introduced **SMBclient** software, which lets a personal computer commmunicate with any MS-Net-compatible local network server, including Syntax's SMBserver for Unix and Digital Equipment Corp.'s VAX/VMS computers.

PC/TCP and NetBIOS are available now, and SMBclient will be available in October. The products are sold as a package for $275.

Syntax, Inc., 1501 W. Valley Highway N., Suite 104, Auburn, Wash. 98001; (206) 833-2525.

Dataran unveils hand-held analyzer

Dataran Corp. recently introduced a hand-held data analyzer for RS-232, synchronous, asynchronous and parallel transmission problems.

The **AutoFox** can receive and generate data and analyze it for such factors as transmission rate, bits per character and parity. The product can also generate test patterns and function as a bit error rate or block error rate tester.

Available now, the AutoFox

(continued on page 29)

Hubbed LAN offers high throughput

By Tom Smith
New Products Editor

MALVERN, Pa. — DNA Networks, Inc. last week unveiled a 10M bit/sec work group local network, which the company claims offers better performance at a lower price than Ethernet, and a 2M bit/sec net designed for small and midsize users.

The 10M bit/sec DNA MegaNet will support as many as 256 users, and the 2M bit/sec DNA MicroNet will support 64 users.

The networks use a server hub and daisy-chain topology, with each server supporting network loops connecting as many as 16 nodes. Workstation network interfaces are available for IBM Personal Computer XTs, ATs or compatibles, IBM Personal System/2s and Intel Corp. 80386-based personal computers. The workstations must run on MS-DOS 3.1 or above.

The networks can be used with shielded twisted-pair cable or telephone-grade cable. Distances from the server to any node can range up to 5,000 feet for MegaNet and 500 feet for MicroNet.

DNA's local nets use the proprietary Device Network Architecture, which was originally developed in 1978 and is used in the company's 1.25M bit/sec DNA Networks Standard Product and its 2.5M bit/sec DNA Networks Product II.

Product II will be replaced by MegaNet, which offers 30% to 300% better performance, according to Bruce Quigley, president of DNA Networks. The Standard Product will continue to be offered.

> To initiate communications, both networks utilize a polling process.
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To initiate communications, both networks utilize a polling process under which a poll identity is assigned to each workstation, Quigley said.

The file server continuously polls devices on the network. When a workstation has data to transmit, it notifies the server that it is ready to do so. Communications is then established between the master and the station.

As part of the polling process, DNA networks use "alarm-bit recognition," which enables the workstation to tell the server the type of data in the packet and the required application.

Having this additional intelligence when it receives the data enables the server to process it more quickly so that network throughput, rather than just line speed, approaches the 10M bit/sec level, which is a benefit over Ethernet, Quigley said.

MegaNet and MicroNet support all Network Basic I/O System calls so that applications requiring full NETBIOS, such as communications packages and data base engines, are supported. DNA Networks' earlier products supported NETBIOS only at the application level; MegaNet and MicroNet support it at the physical level as well.

> As part of the polling process, DNA networks use "alarm-bit recognition."
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Every workstation on MegaNet and MicroNet can access any printer, facsimile machine or modem on the network. Standard Product and Product II could share printers but not fax machines and modems.

Both networks require less than 40K bytes of memory on the file server network interface and approximately 2,000 bytes of memory on the station interface. By loading the system software as device drivers in the upper memory of DOS, DNA has reduced the amount of the personal computer's 640K-byte memory being used and increased the memory available for application software, Quigley said.

Users of the MegaNet product can build their own menu screens, choosing to use the electronic mail, calendar and notepad functions that are included with the software.

The company, which markets its local nets exclusively through resellers, has more than 50,000 boards installed.

MegaNet is priced at $695 for the master board and $395 for each workstation board; it will be available Sept. 1. MicroNet is priced at $345 for a two-user kit; it will be available in mid-October. Both boards come with an operating system, management software and cabling.

DNA Networks can be reached by writing to 351 Phoenixville Pike, Malvern, Pa. 19355, or by calling (215) 296-7420.

E-net board supports demanding programs

Network interface boosts performance by using bus mastering to transfer data to host memory.

By Tom Smith
New Products Editor

BOXBOROUGH, Mass. — Racal InterLan recently announced a microcomputer Ethernet interface that supports bus mastering — the ability to gain exclusive control of the microcomputer's internal bus to support high-speed data transfer from the interface to host memory.

The 16-bit NI6510 data-link controller for IBM Personal Computer ATs or microcomputers based on the Industry Standard Architecture bus can be used with thick- or thin-wire Ethernet.

Bus mastering provides data transfer rates needed for applications such as computer-aided design and manufacturing and high-volume data base queries, according to Fredric Gluck, product manager for Racal InterLan.

Ethernet interfaces that do not use bus mastering, by contrast, must contend for bus access with other system components, which slows processing. For example, 16-bit Ethernet interfaces that do not use bus mastering take 8% to 10% longer to transfer data, according to the company.

Two custom chips also maximize network performance. The first, Interlanx, builds and disassembles data packets, controls access to the cable and handles direct memory data transfer between the interface and its host.

The other chip, Intermanx, synchronizes the sending and receiving stations to assure successful data transfer. Intermanx is compliant with IEEE 802.3 Ethernet specifications.

> Interfaces that do not use bus mastering must contend for bus access with other components.
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NI6510 accommodates host CPU clock rates of 8, 10, 12½, 16, 20 and 25 MHz, as well as bus clock rates of 8, 12 and 16 MHz. Because all clocks on a bus must be synchronized and the controller can support various rates, it is

(continued on page 28)

New Memorex Telex PBXs support up to 16,000 lines

CAMARILLO, Calif. — Memorex Telex Telecommunications recently introduced a new PBX series that supports up to 16,000 lines and is based on the firm's existing switch family.

The heart of the new Lexar System 2000 is the Series 2001 Communications Controller, a hubbing device used to link 512 port modules. The switch modules are currently used in the company's existing Telex 1001S private branch exchange, which supports up to 512 lines, and the 1001M PBX, which supports up to 1,024 lines. Both switches will still be offered as stand-alone devices.

The System 2000 also includes a new line of proprietary digital telephones and system software with new features designed to simplify call handling.

The Series 2001 Communications Controller supports up to 32 switch modules, each of which can be configured with as many as 512 ports, thus providing a maximum switch capacity of roughly 16,000 lines.

In a maximum configuration of 16,000 lines, each of the lines can support simultaneous voice and data on every port, an aggregate bandwidth of more than 1G bit/sec, according to Murrell Worth, director of marketing for the company.

A T-1 interface that is available as an option with the stand-alone PBXs and the new Lexar System 2000 will support the Integrated Services Digital Network Primary Rate Interface as products for that standard are developed, Worth said.

The new system software, Release 8.0, which runs on each module and the central controller, has an integrated automatic call distributor and supports functions customized for vertical market applications such as financial services and lodging.

The company has developed a Software Translation Module that

(continued on page 28)

PBXs support up to 16,000 lines

continued from page 27

will enable users of the Telex 1001 PBX to run Release 8.0. Customers that want to upgrade their software have to send it back to the company.

Memorex Telex also announced the Series 2000 family of digital multiline telephones. The phones offer integrated speakerphone and data communications capabilities through snap-on modules, and support voice and a simultaneous data link at speeds up to 19.2K bit/sec.

The four new phones are Models 2011, 2020, 2021L and 2037L. The 2011 and 2020 support eight and 16 lines, respectively. The 2021L and 2037L, which support 16 and 32 lines, respectively, have two-line by 40-character LCD displays that provide information about incoming and outgoing calls. Each of the phones has customer-programmable keys: the Model 2011 has 11; the 2020 has 20; the 2021L has 16; and the 2037L has 32.

Offered as an option with each of the phones is an additional RJ-11 jack that supports analog devices such as personal computers and modems. This option will be attractive to the lodging industry, where guests often need to connect computers to phones to transmit data, Worth said.

Prices for the Series 2000 telephones range from $120 for the 11-button 2011 to $420 for the 37-button 2037L. The data module costs $120; the speakerphone option is priced at $100. Both will be available in October.

Cost of the Lexar System 2000 switching matrix ranges from $5,000 to $15,000, depending upon configuration. The system is priced at $500 to $800 per line. The product will be available in October.

The company will sell the Lexar System 2000 through its direct sales offices in 25 cities and its 30 licensed distributors.

Memorex Telex can be contacted at 201 Flynn Road, Camarillo, Calif. 93010; (800) 533-8359. California residents can call (805) 388-5000. ☒

Board supports programs

continued from page 27

compatible with multivendor systems.

Although the NI6510 is intended for use in workstations, it can also be used in servers, but the company recommends that only one be used. Equipping servers with two or more NI6510s would degrade performance because of inherent limitations of the AT bus.

Software drivers that will initially be released with the product include workstation and server drivers for Novell, Inc.'s NetWare 286 Version 2.15 and a NetWare Version 2.15 client driver with Transmission Control Protocol/Internet Protocol support.

> The NI6510 can also be used in servers, but the firm recommends that only one be used.
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A menu-driven diagnostics program checks the controller's configuration and reports on network accessibility, addressing conflicts and status.

Several tests are offered, including an echo test that enables a workstation to generate a packet that is returned by a remote workstation, helping to determine the physical integrity of the network.

A NetWare Boot ROM Version 2.1 for use with diskless workstations is also included. The board has an on-board socket to support either 8K or 16K bytes of read-only memory, depending on the needs of the user.

Software support for OS/2 LAN Manager and DOS LAN Manager will be offered in the fourth quarter of 1989.

Racal InterLan also plans to offer an unshielded twisted-pair version of the NI6510 late in the fourth quarter.

The Ethernet controller is available now and is priced at $495.

Racal InterLan can be reached by writing to 155 Swanson Road, Boxborough, Mass. 01719, or by calling (800) 526-8255. ☒

DESIGN YOUR OWN PHONE SYSTEM.

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First Look

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is priced at $449.

Dataran, 355 Yuma St., Denver, Colo. 80223; (303) 778-0870.

MCI, Microsoft unveil E-mail gateway

MCI Communications Corp. and **Microsoft Corp.** recently introduced a software gateway that enables users to exchange MCI Mail and Microsoft Mail electronic mail messages.

MCI Gateway for Microsoft Mail allows Microsoft Mail users to add the delivery and handling options of MCI Mail to their Apple Computer, Inc. AppleTalk local networks.

Microsoft Mail users can now send messages for worldwide postal and courier delivery, facsimile and telex delivery, and electronic delivery to any MCI Mail subscriber.

MCI Mail users can, for the first time, send E-mail messages to Microsoft Mail users.

MCI Gateway for Microsoft Mail supports standard Microsoft and MCI addressing in the same message.

The software is priced at $595 and is expected to be available in October.

Microsoft Corp., 16011 N.E. 36th Way, Box 97017, Redmond, Wash., 98073; (800) 426-9400.

Azure Technologies' PC analyzer debuts

Azure Technologies, Inc. recently announced the latest addition to its IBM Personal Computer-based family of protocol analyzers with a product that lets a Personal Computer emulate an IBM minicomputer for test purposes.

Azure Technologies' **Twinax-Controller** is an add-on board and software that together let an IBM Personal Computer, Personal Computer XT or Personal Computer AT emulate an IBM System/34, System/36, System/38 or Application System/400 minicomputer.

The product lets users capture a problem communications session and use the Personal Computer to recreate the session and determine the problem.

The product can analyze complex graphics sequences such as a printer data stream; moreover, it can be used by developers of IBM minicomputer peripherals, according to the company.

The TwinaxController joins Azure Technologies' existing product line, which includes coaxial and twinaxial cable data scopes and a coaxial cable controller.

Available now, the Twinax-Controller costs $2,995.

Azure Technologies, Inc., 38 Pond St., Franklin, Mass. 02038; (508) 520-3800.

Telcor introduces speedy V.32 modem

Telcor Systems Corp. recently unveiled a V.32 full-duplex modem that uses a proprietary compression algorithm to transmit data at speeds up to 38.4K bit/sec.

Accelerator 3238 evaluates and compresses data in real time, making it 40% to 100% more efficient than Microcom, Inc.'s Microcom Network Protocol (MNP) Level 5 data compression, according to Telcor Systems. The modem can, however, communicate with modems using MNP Level 5.

When telephone lines degrade, Accelerator 3238 can fall back to speeds of 1,200, 2,400, 4.8K, 9.6K and 19.2K bit/sec.

When line quality is restored, the modem will automatically accelerate.

Standard features on the two-wire, dial-up or leased-line modem include password/callback security as well as centralized control through Telcor's Network Administrator Rack Mount Modem Systems.

The modem is compatible with V.22bis, Bell 212A and 103, MNP Levels 2 through 5, and the Hayes Microcomputer Products, Inc. AT command set.

Data Encryption Standard (DES) encryption is available as an option for use when communicating between Telcor modems.

Accelerator 3238 is available now; it is priced at $1,695. The DES software is priced at $100 per unit.

Telcor Systems Corp., 12 Michigan Drive, Natick, Mass. 01760; (508) 653-3995.

Some people think the only way to get a made-to-order telephone system is to buy their own.

There's another way. Working with your telephone company, you can custom design your own system and pay only for the services you need. Just specify Meridian Digital Centrex from Northern Telecom.

Meridian Digital Centrex gives you a powerful portfolio of features and phones. You can mix and match them, add and subtract them. For example:

- Calling Name on a Centrex Display Set, to know who's calling before you answer.
- ISDN, when you want integrated voice and data.
- Meridian ACD, for flexible automatic call distribution.

No other system, no matter how customized, is more flexible than that.

Call your telephone company and say you want to design your own system. Ask for Meridian Digital Centrex from Northern Telecom.

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THE POWER BEHIND NETWORKING™

OPINIONS

VOICE/DATA INTEGRATION

BY SCOTT AUGERSON

Education is the key to user acceptance

"Voice/data integration" has been a buzzword in the telecommunications industry since the 1970s. But the much-heralded phenomenon hasn't really taken place — yet.

It's not due to a lack of technology, however. User interest in voice and data integration was very high in the early part of this decade, but the technological capabilities were lacking. Yet now that the technology is in place, user community response is less than enthusiastic.

Why hasn't the integration of voice and data lived up to growth rate projections?

While many factors have contributed to the slow growth of integration, three factors have often been overlooked: vendor sales training, user organizational structures and competing technologies.

Most telecommunications salespeople are trained in selling voice equipment and services to voice managers, not data managers. Data managers, unlike their voice counterparts, have not really been "sold" on the idea of voice/data integration. Also, data managers have different network concerns than voice managers.

> Vendors must train salespeople to sell users specific solutions to networking problems
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Vendors must train their salespeople to sell users specific solutions to specific networking problems — minus all the integration hype. In addition, they must reassure data managers that voice/data systems are technically capable of answering data concerns such as security, minimum downtime, universal access and application transport.

Organizational barriers to integration can make it difficult to even begin a discussion about voice/data integration. Although the trend is toward integration of the voice and data departments, the two groups generally have separate functions and decision-making processes.

Each group of users believes its domain is more important than the other's and frequently takes action to protect its turf. Many data managers simply do not see the advantages of cooperating with their voice counterparts, and the two groups often end up as adversaries.

One of the main barriers to integration in the user community is the same as within the vendor community: Voice users and data users do not have enough knowledge of one anothers' fields to make informed decisions. First, vendors need to learn the intricacies of both technologies and then help users understand and be comfortable in both realms.

Myriad competing technologies, which may not have been considered when original projections for voice and data were published, are now emerging. Local networks offer high-speed host access for broadcast messages, multiple host access via network interface units and intrafacility interactive computing. Packet switching addresses the dynamic "bursty" nature of data for geographically dispersed terminals and hosts. Multiplexers address an optimization of network facilities between locations. Digital private branch exchanges are optimized for voice and application/network gateway functions. No single information technology is always the most cost-effective solution in all cases.

To make voice/data integration truly viable, vendors must become educators. Rather than simply selling products, they must understand how their products can meet a variety of real-life business applications and then relay this knowledge to users. ◼

Augerson is director of product management for Siemens Information Systems, Inc. in Boca Raton, Fla.

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EDITORIAL

User Excellence Awards

As you've probably noticed already, attached to this week's issue is an entry form* for *Network World*'s Fifth Annual User Excellence Awards. We hope you'll take a few moments to fill out the form and return it before the Sept. 29 deadline.

Why?

Because we believe networking can change the way you do business.

If you agree, and you're working hard to gain a competitive advantage through networking, you owe it to yourself and your organization to get the recognition you deserve.

We began publishing *Network World* nearly 3½ years ago to chronicle innovative applications of network products and services.

Our mission was to show how corporations, government agencies, universities and other users have profited from network technology. (That mission includes providing the most timely news coverage of the events and issues shaping users' network strategies.)

You've kept us busy doing that. In addition to news, each week our pages are filled with stories about users and their network strategies.

We've reported on the ways organizations have employed network technology to cut costs, offered new products and services, and responded to changing market forces.

But we do more than just report on leading-edge users.

Each year, through our User Excellence Awards, *Network World* recognizes users that have made a commitment to leadership in the networking arena.

The awards honor organizations that have transformed communications from a back-room support function to a key component of business strategy.

FIFTH ANNUAL
User Excellence Awards

They put the spotlight on users that are doing what others are only talking about — using networking as a competitive weapon.

Past winners

In the past, we've honored such users as Dow Jones & Co., Inc.; First Interstate Bancorp; Florida Power & Light Co.; First Wisconsin National Bank of Milwaukee; Unified School District 259 of Wichita, Kan.; Midlantic Banks, Inc.; American Express Travel Related Services Co.; and Bechtel Group, Inc.

These organizations were selected for one simple reason: because networking has had a significant impact on the way they do business.

This year's User Excellence Award winners will be featured in a series of articles that will appear in the Dec. 18 issue of *Network World*. In addition, winners will be presented with the awards during a special ceremony at the Communication Networks conference this February in Washington, D.C.

The User Excellence Awards are open to users in any industry, in the government and in academia. And how much you spend on networking isn't important. It's what you're doing that counts.

Send it in

So let us know how your organization has benefited from networking. The attached questionnaire asks about your involvement with a variety of network technologies. Give us a brief explanation of what you're doing, using the back of the form or attaching a separate sheet of paper if necessary.

What we're trying to determine is how innovative your organization is in applying technology. If the questions don't apply to you or don't get to the heart of what you're working on, tell us in your own words.

But, above all, tell us.

Take the time to enter today. And good luck!

*The entry form will also be included in next week's issue of *Network World*.

OPINIONS

ELECTRONIC FUNDS TRANSFER

BY WILLIAM PATTERSON

Overcoming the float time in electronic payment use

The ocean liner companies of the 1950s were dismayed at the increasing use of air travel to shuttle people between America and Europe. One cruise line advertised that "getting there is half the fun" in an attempt to persuade people to continue using the oceans for travel between continents.

However, most travelers inevitably decided in favor of the airlines. Although ocean liners could provide a greater variety of entertainment, the airlines could deliver passengers to their destinations more quickly, thus allowing them to spend more time at their desired locations.

Electronic funds transfer faces a similar predicament. When the subject of using electronic funds transfer to pay for goods acquired through electronic data interchange arises, float is mentioned as an obstacle. Some bureaucrats, like ocean liner captains, earn a living through float. "If we send our payments immediately, we will lose the interest we would gain at the bank while the paper check is clearing," they say.

But float is inefficient. From the customer's point of view, if no concessions are obtained from suppliers, then a customer — who unilaterally provides the funds for purchases — gains no advantage from the onset. However, buying and selling are not separate unilateral processes.

Currently, many suppliers send bills with terms, such as offering a 2% discount if the bill is paid within 10 days and requiring the full amount in 30 days. However, the customer can pay by paper check on the 10th day and mail it; therefore, the supplier has to wait to receive the check, bank it and wait for it to clear before using the funds.

To improve this situation, suppliers will begin to offer terms that are favorable to their electronic funds transfer-connected customers. The old terms will change to reflect more of a sliding scale — based on days and percentage points over prime, with significant advantages accruing to the firm making payments through electronic funds transfer.

This is technically feasible. But it also has to be economically feasible for all parties concerned. If the trading partners do an extremely high volume of business — such as in the case of General Motors Corp. and PPG Industries, Inc. — that volume can easily justify arrangements that include proprietary networks and special terms. But what about small and midsize companies?

Suppose, hypothetically, the Cleveland Jobber Co. receives an order from Ohio Manufacturing for a set of sheaves and V-belts. The order is received electronically from an EDI service vendor, filled from stock and shipped. The invoice is generated and sent. By the time Cleveland Jobber has the funds to use, assuming no credit problems exist, 30 to 60 days have passed.

Suppliers will begin to offer terms that are favorable to EFT-connected customers.

▲▲▲

Given an annual revenue of $10 million from similar sales, this type of delay is equivalent to a year's worth of 30 to 60 days interest on $10 million — or a conservative estimate of $100,000 per year.

The First Cleveland Bank approaches Cleveland Jobber with an idea: provide extra discounts to customers who use electronic funds transfer and share the benefits with them.

Cleveland Jobber says, "That's fine, but we don't have the installed equipment, procedures or personnel to handle this." The bank replies that it can interface with the EDI service vendor to:

- Receive and retransmit an electronic payment from Ohio Manufacturing drawn on its bank and payable to Cleveland Jobber.
- Receive and retransmit full remittance advice that can be matched to the invoice records in Cleveland Jobber's accounts receivable system, saving it time and effort in reconciliation.
- Provide software or services to compute extra discounts provided to Cleveland Jobber's customers and thereby provide increased efficiency and control over the receivables process.
- Provide benefits to Cleveland Jobber from the increased balances that include services, interest or simply the opportunity to invest the extra money. Of course, benefits will also go to the customers who gain cash discounts, who will then have an extra incentive to do business with Cleveland Jobber.

But what's in it for the bank? A competitive edge that initially will distinguish its services from those of its competitors and serve to cement its relationships with its clients, as well as the relationships among its clients and, in turn, their customers. In reality, banks are in the detail financial transaction handling business: A small fee can be charged on a per-transaction basis for handling transactions.

An EDI position paper prepared this year by the staff of the National Automated Clearinghouse Association (NACHA) only examines three methods of payment currently open to trading partners: paper check, electronic payment over the Automated Clearinghouse (ACH) network and electronic payment over a bank's proprietary EDI network. Not mentioned as a possibility is payment through third-party, EDI value-added networks. This is clearly a possibility for the future.

The ball is rolling. Atlanta-based Harbinger Computer Services provides a universal service allowing all types of firms to exchange documents and payments electronically in association with several banks.

As more banks and EDI service vendors climb on the bandwagon, the banks will cement their relationships with clients and, in turn, provide each of them with the chance to develop their own competitive advantages.

Just as today's ocean liner companies have repositioned themselves to handle the ever more popular cruise trade, tomorrow's cash managers will have more work to do in developing policies for managing the flow of this new cash through their firms. Those who don't make the transition will be left in the back office backwash. ☑

Patterson is president and principal consultant for Stratford Technologies, Inc., a computer and business consulting and research firm located near Stratford, N.J.

TELETOONS

BY FRANK AND TROISE

Good morning.. American Telepathic Society... No.. I'm sorry.. his mind is busy.. ..Will you hold?
RECEPTION

LETTERS

The gender/humor gap

In the June 26 issue of *Network World*, I found a cartoon that at first amused me — the one with the lady being told that her pay was equal, that is, equal to 60% of the man's. A few moments of thought destroyed all of the humor.

There is nothing funny about telling a woman her contribution to an organization is less than that of a male worker just because she is a woman. Even in the enlightened '80s, there are still those who believe the little woman belongs in the home. Some who feel that way are in decision-making positions that allow them to decide the future of employees of both sexes. It is easy to see that even now, a woman could easily get less than an even break.

Everyone thinks it's better now because in 1989, a woman cannot be fired for becoming pregnant, as she could in

(continued on page 64)

Network World *welcomes letters from its readers. Letters should be typed, double-spaced and sent to Editor,* Network World, *375 Cochituate Road, Box 9171, Framingham, Mass. 01701. Letters may be edited for space and clarity.*

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It's no secret

CONTINUED FROM PAGE 1

warning labels on radio scanning receivers. These scanners allow the listener to monitor radio frequencies and lock in on a specific channel once a signal is received.

The labels would have informed consumers that scanners may violate the Electronic Communications Privacy Act (EPCA) of 1986 through the intentional interception of protected radio communications, such as cellular telephone calls. Although the FCC acknowledged that scanners are fully capable of intercepting cellular calls, it concluded that "regulatory action is not necessary at this time."

Not everyone shares the FCC's complacency. Sharon Nelson, chairwoman of the Washington State Utilities & Transportation Commission, predicts that privacy-related issues could emerge as a major battleground in the telecommunications industry over the next five years. "It's a matter of time before there is a national debate," she concludes.

In 1986, Congress passed the ECPA, which for the first time made it a crime to intercept cellular conversations. The legislature and regulatory agencies, it would seem, are on the case, and will act if necessary.

The problem is that legislation does not repeal the laws of physics. The frequencies allocated for cellular use in the FM band (between 825 MHz and 890 MHz) are widely accessible.

As a result, conversations on cellular telephones can be picked up by scanners or even by manual ultra-high frequency (UHF) television tuners manufactured before 1982. Laws and regulations can't change that.

Despite industry protestations to the contrary, transmitting voice and data with cellular technology is not secure.

Reports of cellular interceptions abound. Computer and telecommunications consultant Robert Jesse claims that he overheard two Baltimore politicians discussing how to prevent the press from discovering an affair between a politically active man and woman. Without revealing any names, Jesse related this and other examples

(continued on page 36)

Corn-Revere practices communications law at the Washington, D.C. law firm of Hogan & Hartson.

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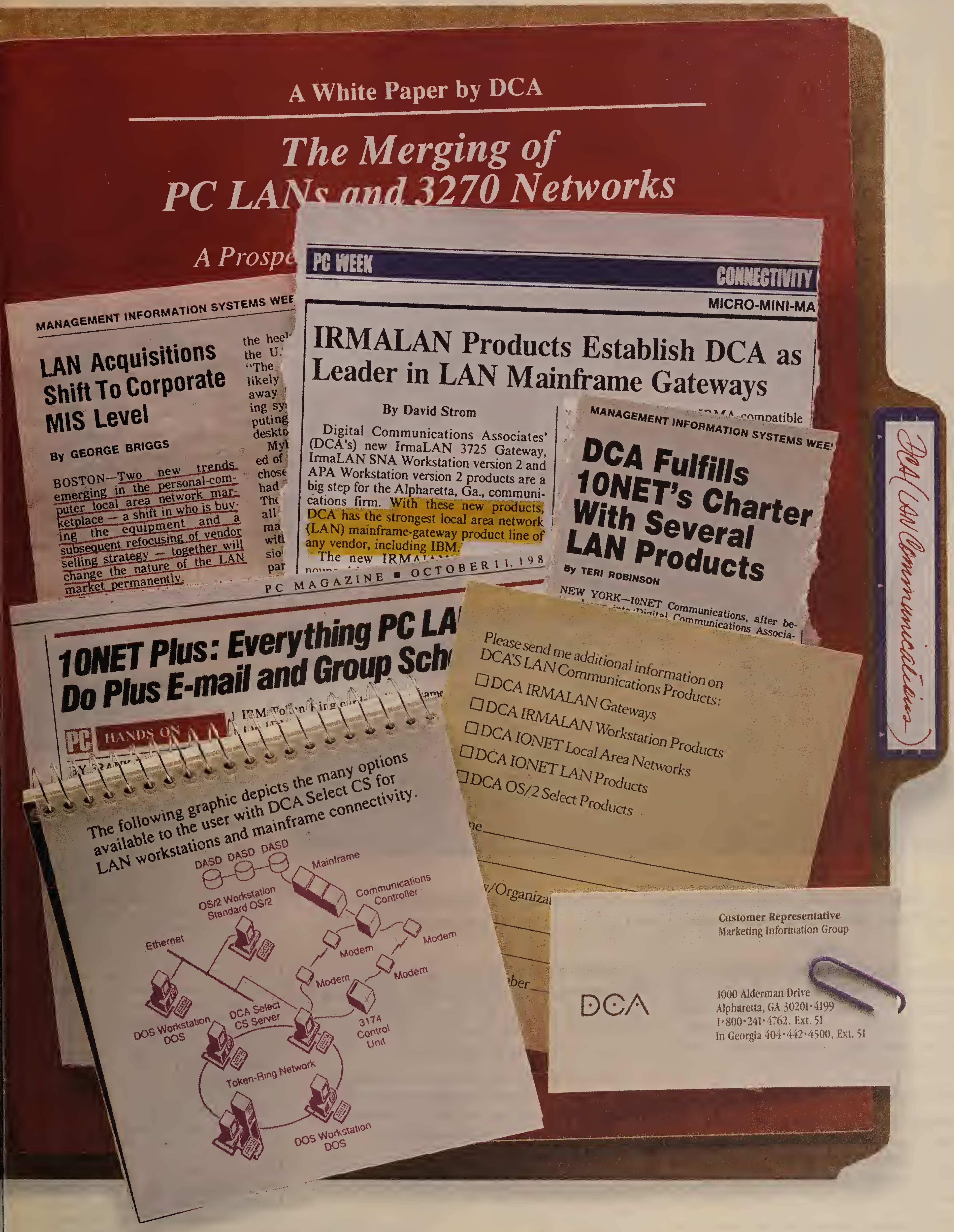

A White Paper by DCA

The Merging of PC LANs and 3270 Networks

A Prospe

MANAGEMENT INFORMATION SYSTEMS WEE

LAN Acquisitions Shift To Corporate MIS Level

By GEORGE BRIGGS

BOSTON—Two new trends emerging in the personal-computer local area network marketplace — a shift in who is buying the equipment and a subsequent refocusing of vendor selling strategy — together will change the nature of the LAN market permanently.

PC WEEK CONNECTIVITY

MICRO-MINI-MA

IRMALAN Products Establish DCA as Leader in LAN Mainframe Gateways

By David Strom

Digital Communications Associates' (DCA's) new IrmaLAN 3725 Gateway, IrmaLAN SNA Workstation version 2 and APA Workstation version 2 products are a big step for the Alpharetta, Ga., communications firm. With these new products, DCA has the strongest local area network (LAN) mainframe-gateway product line of any vendor, including IBM.

PC MAGAZINE ■ OCTOBER 11, 198

MANAGEMENT INFORMATION SYSTEMS WEE

DCA Fulfills 10NET's Charter With Several LAN Products

By TERI ROBINSON

NEW YORK—10NET Communications, after be-

10NET Plus: Everything PC LA Do Plus E-mail and Group Sch

PC HANDS ON

The following graphic depicts the many options available to the user with DCA Select CS for LAN workstations and mainframe connectivity.

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(continued from page 32)

to the FCC in support of a cellular telephone warning label.

A Kansas City, Mo., scanner hobbyist reports that it is "darned exciting to listen to some of those calls. If soap operas are your thing, you'll love them."

Others have had the same experience. As Chuck Gysi, a New Jersey newspaper editor and scanner enthusiast, told the *Wall Street Journal,* "You hear businessmen discussing the stock market [and] placing orders."

Some of the overheard information is quite sensitive. In one conversation picked up, and subsequently reported, a lawyer disclosed in confidence that an agricultural processing plant was about to receive a $1 million federal fine.

With the number of cellular telephones in the U.S. recently passing the two million mark, privacy is bound to become a more significant concern in the future. Currently, only a fraction of the 10 million radio scanners are capable of receiving 800-MHz cellular frequencies, but the number is increasing rapidly.

Regency Electronics, Inc. introduced the first 800-MHz scanner in late 1984 and within two years, it had sold 50,000 units.

Other manufacturers, such as Tandy Corp. and Uniden Corp. of America, quickly produced competing scanners. Tandy has since discontinued its cellular scanners, as has Uniden. Still, other firms have continued to offer full-range scanners. And for less than $100, a hobbyist can purchase a converter that will allow older scanners to receive 800-MHz signals.

The "Reuter Business Report" stated that by 1988, one million Americans owned scanners that could monitor cellular calls.

Data is vulnerable, too

Conversations are not the only communications that might be intercepted. Data transmission, which promises to be a major component of cellular business in the future, could be a prime target of industrial espionage. For example, real estate firms, such as the Halstead Property Management Co. in New York, are already using data transmission on cellular channels to provide updated property listings.

A wide variety of cellular data terminals are already on the market with a myriad of potential business applications in areas such as sales, construction, real estate and emergency rescue operations. Because such data is transmitted over radio frequencies, it is subject to interception in much the same way as a conversation. Data may be even more vulnerable because data transmissions often originate from stationary terminals, making interception even easier.

Industrial espionage has already occurred in the cellular arena, albeit in a slightly different context. In Dallas, cellular phone company Metroplex Telephone Co. complained to the FCC that its competitor, Southwestern Bell Telephone Co., monitored Metroplex's data transmissions to discover business secrets such as the number of telephone calls, traffic patterns and even individual phone numbers of subscribers.

Southwestern Bell Telephone denied any wrongdoing but admitted that it used the system's diagnostic equipment to conduct a "market study" to determine its market share. With encouragement from the FCC's Enforcement Division, the two carriers reached an informal agreement in 1987 wherein Southwestern Bell Telephone agreed not to use its cell-site monitoring devices to pick up data from the Metroplex system.

Prime location

Another privacy implication of cellular technology involves its ability to locate subscribers' vehicles in the system. Because the cellular switching office must be able to locate each mobile unit geographically to complete calls and regulate radio frequencies, a potential for surveillance exists.

> The "Reuter Business Report" said that by 1988, one million Americans owned scanners that could monitor cellular calls.
>
> ▲▲▲

Cellular system designers agree that it is conceptually possible to track a person's movements accurately. Depending on network design and the incremental features offered — for example, an automatic vehicle location function that would combat automobile theft — a user's vehicle may be located with almost pinpoint accuracy.

Surveillance of this type generally would be limited to police investigations because it requires access to the switching office. Police already have been allowed access to conduct cellular wiretaps, and use of electronic tracking devices — called "bumper beepers" — is a standard law enforcement tool.

And it is only a matter of time before law enforcement authorities put the two techniques together. But most cellular subscribers are not aware that this can happen.

Cellular telephone companies have been schizophrenic on issues of privacy. When dealing with customers, the firms refuse to acknowledge that any problem exists. A Nynex Corp. advertisement for cellular telephone service proclaimed, "Just dial . . . you get your own private line instantly," while a Washington, D.C. area

(continued on page 61)

"Look, I understand why we need to connect your network to my IBM system; let's just make sure the software we choose doesn't affect next week's payroll run."

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NETWORKING SOLUTIONS

DSU/CSU

You'd better shop around

The market for data service units (DSU) and channel service units (CSU) is due for an upheaval.

Unless users buy smart today, quite a few may find themselves stuck with a virtually worthless CSU. A new standard for the extended superframe format (ESF) used with AT&T's Accunet T1.5 service has recently been approved, and the major carriers plan to implement it. However, many CSUs can't support it.

DSU buyers are also in a quandary. AT&T's Dataphone Digital Service (DDS) is still the preferred channel for those needing a digital transmission facility at speeds lower than T-1. However, AT&T and Cable & Wireless Communications, Inc. are enticing users with fractional T-1 services, which offer more capacity than DDS at a lower cost. MCI Communications Corp. and US Sprint Communications Co. have also announced fractional T-1.

CHART • GUIDE

A chart comparing channel service units is on page 40, and a chart listing a mix of data service units is on page 58.

What does this mean to the user? Before jumping the DDS ship, users should learn about the not so obvious limitations and costs associated with fractional T-1.

A DSU/CSU combination must function on DDS lines, while only a CSU is required on Accunet since the T-1 multiplexer handles the DSU function. However, DSUs and CSUs must comply with Bell Publication 62310 and Federal Communications Commission Part 15 and 68 regulations before they can be attached to DDS or Accunet.

The DSU converts the data stream generated by the customer's data terminal equipment (DTE) into the bipolar format required for transmission over the digital network.

The CSU terminates the circuit, performs signal regeneration and handles remote loop-back testing. It also monitors the incoming signal to detect bipolar violations and ensures that the data stream conforms with the zeros and ones density required by the carrier.

To maintain synchronization, AT&T requires that the data stream contain no more than 15

(continued on page 44)

> Market changes may mean that DSU/CSU buyers who do not shop wisely will find themselves stuck with worthless equipment.

Hunter is president of TMS Corp., a telecommunications consulting firm in Wayne, Pa.

By JOHN HUNTER

Channel service units

Vendor	Product	Data rate (bit/sec)	Selectable pulse density	ESF compatibility	DTE interface	Remote diagnostics	Error statistics gathered	Power supply	Price
Avanti Communications Corp. **Norwood, Mass.** **(617) 551-3333**	Open Network Concentrator 10	1.544M, 2.048M	15 consecutive errors	No	RS-449, MIL 188/114, CCITT V.35, CCITT X.21, DSX-1	Remote Channel 1 and 2, remote aggregate	None	Line and internal	$2,500 to $3,700
Canoga-Perkins Corp. **Chatsworth, Calif.** **(818) 718-6300**	Model 2290	1,200 to 6.312M	None	Yes	RS-232-C, RS-449, CCITT V.35, DS1, TTL	Local and remote loop-back, self-test	None	Line	$1,100 to $7,000
Case/Datatel, Inc. **Cherry Hill, N.J.** **(609) 424-0303**	DCP 3551	1.544M	15 consecutive zeros	No	DS1 15-pin bipolar	Remote loop-back	None	Line	$1,750
	DCP 3552	1.544M	15 consecutive zeros	Yes	DS1 15-pin bipolar, RS-422, CCITT V.35	Remote loop-back, built-in test generator	Errors sent and received, error-free seconds, seconds in test	Line and internal	$2,950
Coastcom, Inc. **Concord, Calif.** **(415) 825-7500**	T1MIII	1.544M	15 consecutive zeros	Yes	RS-232-C, RS-422, CCITT V.35	Line and channel loop-back, self-check	Frame loss, bipolar violations, error-free seconds	Internal	$3,995
Codex Corp. **Canton, Mass.** **(617) 364-2000**	Model 6262	56K or 1.544M	15, 47 or 80 consecutive zeros	Yes	RS-232-C, CCITT V.35	Remote loop-back, self-test	Errored seconds	Line and internal	$1,600 for card; $2,600 stand-alone model
Digital Link Corp. **Sunnyvale, Calif.** **(408) 745-6200**	DL551VX	1.544M or fractional T-1	16 or 79 consecutive zeros	Yes and T 1.403	RS-422, RS-449, CCITT V.35	Local and remote loop-back, self-test	Error-free seconds, AT&T 54016 error statistics (CRC errors, errored seconds, failed seconds, etc.) frame errors, bipolar violations	Internal	$3,195
	DL551X	1.544M or fractional T-1	16 or 79 consecutive zeros	Yes and T 1.403	DS1 15-pin bipolar	Local and remote loop-back, self-test	Error-free seconds, AT&T 54016 error statistics (CRC errors, errored seconds, failed seconds, etc.) frame errors, bipolar violations	Internal	$2,880
General DataComm, Inc. **Middlebury, Conn.** **(203) 574-1118**	DataComm 551 ICSU	1.544M	15 or 39 consecutive zeros	Yes	DS1	Remote loop-back	AT&T 54016 ESF statistics (CRC errors, errored seconds, failed seconds, etc.)	Internal	$2,495
Hubbell, Inc. **Pulsecom Division** **Fairfax, Va.** **(703) 471-2900**	DSU-HR	56K, 64K, 1.544M	None	Yes	RS-422, RS-449, CCITT V.35	Remote loop-back	NA	Channel bank	$625
Kentrox Industries, Inc. **Portland, Ore.** **(503) 643-1681**	T-Smart	1.544M	15, 47 or 80 consecutive zeros	Yes and T 1.403	RJ48H, DA-15	Remote loop-back	Errored seconds, bursty errors, bipolar violations, signal loss, error-rate threshold exceeded, yellow alarms	Line or internal	$1,950 for rack-mounted version; $2,550 stand-alone
Larse Corp. **Santa Clara, Calif.** **(408) 988-6600**	TNDS	1.544M	80 consecutive zeros	Yes and T 1.403	RJ48, DA-15	Local and remote loop-back, self-test, bipolar violations, built-in test pattern generator	Bipolar violations, CRCs, out-of frame errors, signal loss, excess zeros, errored seconds, failed seconds, line unavailable seconds, yellow and red alarms	Internal	From $3,195
	TDSU/TDIU	1.544M	None	Yes and T 1.403	RS-422, RS-449, CCITT V.35	Remote loop-back	Bipolar violations, CRCs, out-of frame errors, signal loss, excess zeros, errored seconds, failed seconds, line unavailable seconds, yellow and red alarms	Line and internal	$3,195 to $6,290
Phoenix Microsystems, Inc. **Huntsville, Ala.** **(205) 721-1200**	DATA-T	1.544M	80 consecutive zeros	Yes	RS-232-C, RS-449, CCITT V.35	Local and remote loop-back	AT&T 54016 ESF statistics (CRC errors, errored seconds, failed seconds, etc.)	Line and internal	$2,283
	T-1 CSU	1.544M	80 consecutive zeros	Yes	NA	Local and remote loop-back, bit error rate test	None	Internal	$2,647
Racal-Milgo **Sunrise, Fla.** **(305) 592-8600**	Omnimux Intelligent CSU	1.544M	16 and 80 consecutive zeros	Yes	RJ-48	Local and remote loop-back, test patterns, user-defined alarms based on thresholds and conditions	CRC errors; out-of-frame events; synchronization loss; failed, unavailable, errored and severely errored seconds; bipolar violation; signal loss; yellow and blue signals	Internal and line	$3,994 for stand-alone model; $2,744 for rack-mounted model
Scitec Communications Systems **Middletown, R.I.** **(401) 849-4353**	Integrator 1544	1.544M	NA	No	RS-422, RS-449, CCITT V.35	Local and remote loop-back	None	Line and internal	$4,000
TeleProcessing Products, Inc. **Simi Valley, Calif.** **(805) 522-8147**	TP-1544	1.544M	None	No	DB-15 (DSX-1)	NA	None	Line or internal	$1,795
Tellabs, Inc. **Lisle, Ill.** **(312) 969-8800**	Model 411 T-1 Access System	1.544M	15 consecutive zeros	Yes	T-1	Local and remote loop-back	Errored seconds, network errored seconds, failed seconds, errored and failed seconds, bit errors	Line and internal	$1,100
Timeplex, Inc. **Woodcliff Lake, N.J.** **(201) 391-1111**	Link/CSU	1.544M	15 or 80 consecutive zeros	Yes	RS-422	Through Link/2 multiplexer	Bipolar violations, errored seconds, failed seconds, failed signal, synchronous loss	Internal	$3,120 to $7,500
Universal Data Systems, Inc. **Huntsville, Ala.** **(205) 721-8000**	T1-CSU	1.544M	15 consecutive zeros	Yes	T-1	Local and remote loop-back	None	Line and internal	$1,250
Verilink Corp. **San Jose, Calif.** **(408) 945-1199**	Model 551 VST List 2 ESF CSU	1.544M	80 consecutive zeros	Yes and T 1.403	CCITT V.35	Line, data and repeater loop-back	Bit error rate	Internal	$2,450
	Connect DSU/CSU	56K, 64K, 128K, 224K, 384K, 448K, 512K, 768K, 896K, 1.024M, 1.344M, 1.528M, 1.536M, 1.544M	15 consecutive zeros	Yes and T 1.403	RS-449, CCITT V.35	Remote loop-back	CRC errors, bipolar violations, excessive zeros, low bit density	Line or internal	$2,595

B8ZS = Binary 8 zero substitution
CRC = Cyclic redundancy check
DTE = Data terminal equipment
ESF = Extended superframe format
NA = Information not available

This chart includes a representative selection of vendors in the channel service unit market. Most vendors offer other channel service units, and many vendors not included offer a full range of competitive products.

SOURCE: TMS CORP., WAYNE, PA.

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AT&T Paradyne

(continued from page 39)

consecutive zeros and that the ones density average less than 12.5% of the transmitted data. The laws governing carrier services, however, state that the number of zeros can be much higher.

"Right now, the law says you can transmit as many as 80 consecutive zeros without harming the network," says Bill Buckley, chairman of the T1E1.2 working committee of the Exchange Carriers Standards Association (ECSA) and vice-president for product development with Verilink Corp. in San Jose, Calif.

"However, [pulse density] limits will change in December 1989," he says. "The new law states that low pulse density will not harm the network, but users should be aware that anything with more than 15 consecutive zeros or a ones density averaging more than 12.5% could adversely affect performance."

DSU facilities

The data rates at which DSUs operate must rigidly adhere to AT&T specifications. For DDS, the primary rate is 56K bit/sec, although subrate speeds of 2,400, 4.8K, 9.6K and 19.2K bit/sec are also supported. For T-1, the data rate in North America and Japan is 1.544M bit/sec; in Europe, it's 2.048M bit/sec.

Since all DSUs must conform to the aforementioned Bell and FCC specifications, networks containing heterogeneous DSUs can be constructed. While this allows interoperability, users should be aware that vendors use proprietary schemes for their diagnostics. Therefore, end-to-end diagnostic compatibility is unlikely.

Many DSUs contain secondary channels that are used primarily to pass diagnostic test commands and out-of-band messages; consequently, regular data transmission is not disrupted. Some DSU secondary channel facilities operate only with vendor-proprietary equipment, while others will function with AT&T's DDS-Secondary Channel (SC) facilities — also known as DDS-II.

DDS-SC allows testing and monitoring similar to that which can be attained with modems having secondary channels. And as with modems, the level of testing will vary depending on the sophistication the DSU vendor builds into the product.

All DSUs have fairly similar rudimentary diagnostics. They support line loop-back tests to check the integrity and performance of the line between the user's equipment and the AT&T central office, as well as the link between near-end and far-end DSUs.

Just about all DSUs let the user perform a DTE loop-back to check the integrity of the link between the DSU and the originating terminal equipment. However, as shown in the accompanying comparison charts on page 40 and page 58, some vendors also offer more advanced diagnostics.

DDS-SC became a tariffed service a few years ago but was available only in a limited number of geographic regions. While service availability has greatly improved, it still isn't everywhere.

According to Tom Ball, product manager for AT&T's DDS, "Most states have SC presence in Bell operating company and AT&T offices, but independent telephone companies may not. SC is also not available in Pennsylvania, Delaware and North Dakota," he says.

Companies wanting to implement private DDS-SC-like services can use Case/Datatel, Inc.'s DCP 3800 and Teleprocessing Products, Inc.'s Multidrop Network Management System. Those products operate over the DDS line and create pseudo-secondary channels that are used for passing diagnostic information ("Powerful DSUs, CSUs monitor and diagnose digital networks," *NW,* Jan. 18, 1988).

In addition to conducting standard tests, users can take advantage of AT&T's Automatic Bit Access Test System (ABATS) and Customer Test Service (CTS) facilities, which allow for more sophisticated testing. ABATS test centers operate in conjunction with local phone company facilities and can check the entire network up to the DSU.

The ABATS line loop-back test returns the bipolar signal from the remote DSU. Its digital loop-back test checks the entire network back to the remote DSU's DTE interface. Because the test data is looped back through the DSU, the test center can verify the data after it has been decoded, reclocked and retransmitted. But ABATS tests are inband and disrupt data flow.

Unlike ABATS tests, which are performed primarily by AT&T personnel, CTS allows the user to identify the network problem and isolate its cause. Users access CTS through an asynchronous terminal and dial-up connection to a CTS computer. AT&T permits users to initiate loop-back tests in both directions as well as tests to the DSU.

CTS is only available on interstate DDS circuits and performs disruptive tests on point-to-point and multipoint circuits. To soften the impact of disruptive testing, AT&T allows users to specify in advance the circuits to be tested and the times when the tests should be performed.

On borrowed time

When AT&T, Cable & Wireless Communications, MCI and US Sprint announced fractional T-1 services, many people predicted that DDS was all but doomed. So why bother with DSUs? While DDS may be on its way out, a few things will have to change before that occurs.

Fractional T-1 permits users to purchase part of a T-1 line's transmission capacity instead of paying for the entire 1.544M bit/sec bandwidth. If users need only 128K bit/sec, that's all they pay for. Plus, carriers have aggressively packaged and priced their fractional T-1 services. AT&T's Accunet Spectrum bundles its fractional service in combinations of 64K bit/sec DS0s, and users can purchase 128K, 256K, 512K and 768K bit/sec at

(continued on page 58)

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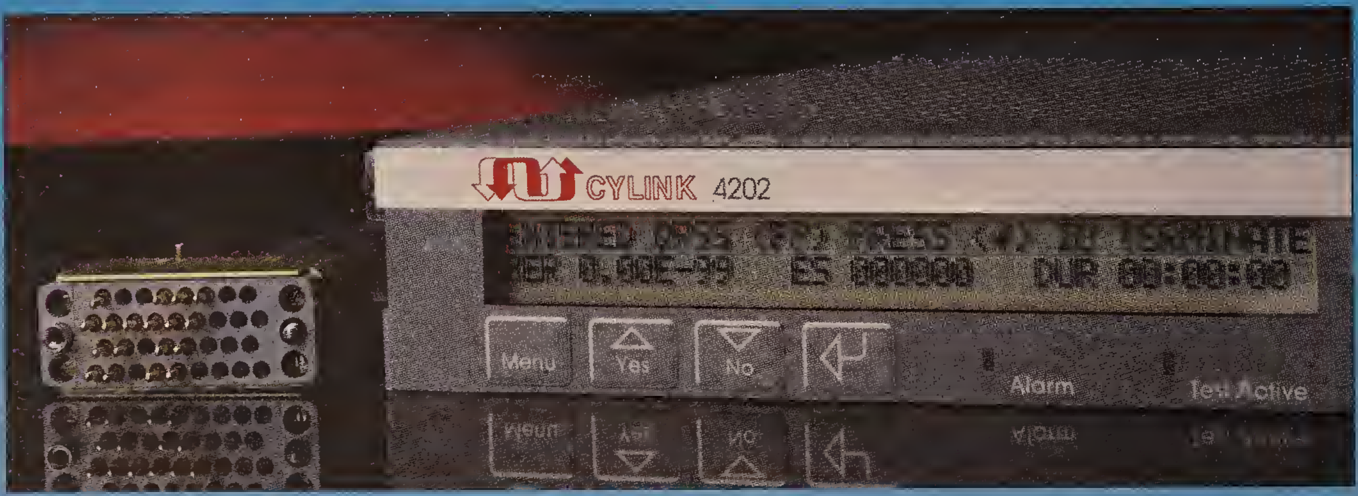

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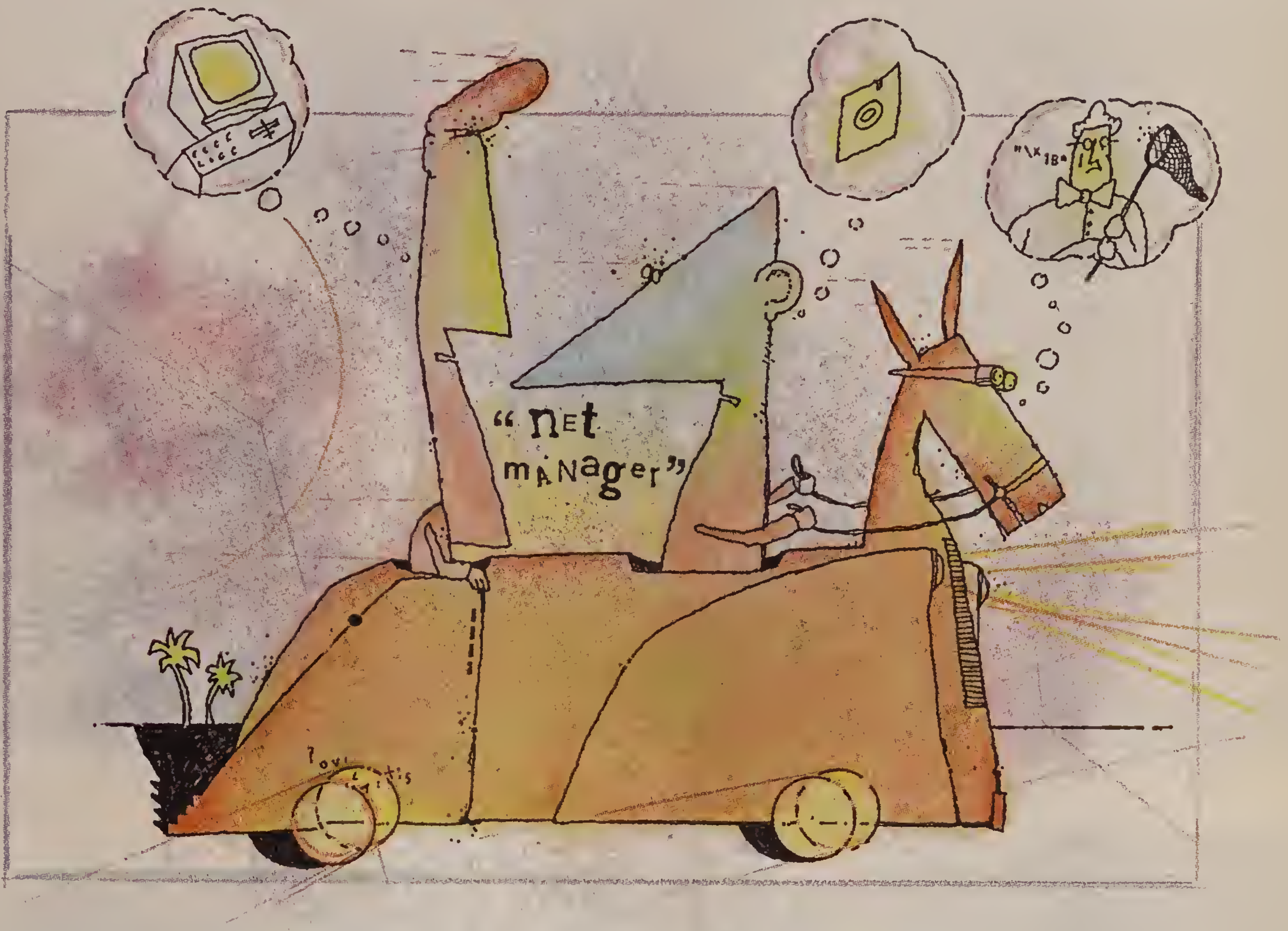
You say tomato, and I say throughput

By BRUCE GUPTILL



“It were not best we should all think alike,” wrote Mark Twain. “It is difference of opinion that makes horse races.”

Well, that's fine for the late Mr. Twain and perhaps for the horses, but not for the networking industry.

We're in an industry that demands precise placement of binary ones and zeros, but we have trouble agreeing on the best way to line them up. Once we get them lined up, there are usually at least two ways of counting them. And when we're done counting them, we disagree on what the numbers mean.

We also disagree on what many basic, seemingly simple terms mean. “Network management,” for example, means different things in different contexts. It can be deciding where to put the wires. It can be the efficient allocation of equipment, people and finances to make the system run smoothly. Some vendors say their modem software is network management software.

Even the term “network manager” is confusing. Depending on who's talking, it can mean a software package, an HP 4972 analyzer or a guy named Jack.

At 1988 Comdex/Fall in Las Vegas, I stood with a local-area network manager (the human kind) for a large automobile manufacturer as he questioned representatives of a large local network vendor. There were discrepancies between what his network would do and what he thought it should do. The representatives told him that he and his staff had asked the wrong questions and that he had misunderstood or misinterpreted their answers.

“You have to know what questions to ask,” he was told. “We know what *we* meant.”

The root of the problem was a disagreement over network performance; specifically, on the meaning of the term “loading.” When the manager said “loading,” he meant the amount of information in the packets sent through the network; when the vendor said it, it meant the number of packets traversing the network at any one time. The upshot was a network that was too slow, a very disgruntled user and several weeks of effort by vendor support and sales people to rectify the situation.

“ ‘Performance’ and related terms are a minefield for users, particularly the different ways of measuring things like response time and throughput,” says L. David Passmore, a principal with Fairfax, Va.-based Network Strategies, a consulting practice of Ernst & Whinney. “If you talk packet/sec throughput, it's a meaningless thing because what's the packet size?”

Another discordant performance term is “response time,” according to Passmore and others.

“ ‘Response time’ is the [term] I hear the most semantic arguments over,” says Hub Vandervoort, senior telecommunications consultant for TMC/CTG, a telecommunications consultancy and network design firm in Needham Heights, Mass.

“What is the vendor's definition of end-to-end response time?” Vandervoort asks. “Is it the same as the user's? Is it first byte out, last byte out, first in, last

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When users and vendors start talking, too often what we get is a failure to communicate.

Guptill is features writer for Network World.

ILLUSTRATION ©1989 DAVID POVILAITIS

(continued from page 45)

in? Does it constitute switch delays? Is the host included? Is the front end included?"

"Essentially, all this falls under the area of quantifying performance," Passmore explains. "The terms we see most often confused are 'response time,' 'throughput' and 'availability.'

"Often when people are writing requests for proposal, those are the things they're trying to spec out. And all three have so many different interpretations; no matter how you specify it, a vendor can say 'We meet that' and come up with a way of weaseling out of what you meant in the RFP."

Unavailable availability

"Availability" is a term that seems innocuous enough. Vendors and users alike usually agree on a general meaning: the amount of time a network is available to users, or uptime.

Most network support contracts, especially for leased lines and other wide-area network components, specify a certain amount of uptime or availability.

Methods for quantifying availability vary, and that's where the misunderstandings come in — especially when something goes wrong.

"Sometimes people specify network availability in terms of percentages," explains Passmore. "Ninety-nine point something is not unusual.

"Other ways to do this are in terms of maximum permissible errors or downtime in terms of hours."

But is that for a single user or is that for an entire network? Will you get all of your outage at once or spread it over the length of the contract? If your specification says the network will be down no more than five hours over the course of the year, could that five hours occur in one day? The answers would make a big difference in how your application responds.

Incompatible compatibility

"Compatibility," in and of itself, is another harmless word. It's only when you start attaching it to other terms that the trouble starts. It doesn't often mean that the product or process is the *same* as what it's "compatible" with; it more often means that the item in question works in a similar manner or can somehow connect to something with which it's "compatible."

"What does it mean to be ISDN-compatible?" Passmore asks rhetorically, "or [Systems Application Architecture]-compatible? There probably is such a thing as SNA-compatible because SNA has been around for 15 years. But SAA? I find it amazing how, within five minutes of IBM announcing the SAA standards — which are changing, by the way — all these vendors come out and say they have products that are 'SAA-compatible.' They pick one little piece of the standard and show that they meet it.

"Anything of the form 'blank-compatible' will generally give you problems," he says.

To add to the confusion, compatibility does not ensure "connectivity," and neither of those always gives you "interoperability."

Connectivity is the movement of bits or packets between nodes in the network; it's a transport function, moving the bits through the network.

Interoperability implies that you're running the same protocols at Open Systems Interconnection Layers 4 through 7, so the system can actually understand what those bits mean.

"Users want different applications and different computer systems to be able to exchange data," says James Herman, a principal with Northeast Consulting Resources, Inc. of Cambridge, Mass. "Vendors rarely deliver on that need. It's an area of tremendous overstatement and underfulfillment.

"With interoperability, you can think you've solved the problem of getting the systems to have a data pathway," he explains. "Then, you find out that all the data formats are different. Even if you get some format problems solved, you find out that there are still differences in the way the systems interpret data. There's a huge amount of confusion."

"I've seen RFPs written by people who really didn't think this through, and they thought they were getting interoperability," Passmore says. "What they got was connectivity because of the way they said it [in the RFP]."

Bridging a new route

Since we're talking about getting from here to there, what's the difference between a bridge, a router and a brouter?

Again, it depends on who's talking, but some semigeneric definitions are starting to shake free of the confusion.

"Bridge vendors are now offering features that were previously available only on routing bridges and routers," says John Hunter, president of TMS Corp., a telecommunications consulting firm in Wayne, Pa. "As a result, too many people are confused as to what's what."

Passmore defines a bridge as a device that "operates only at OSI Layer 2," he says. "There's really only two flavors of bridges out there: the IEEE 802.1 spanning tree and the 802.5 source-routing bridges."

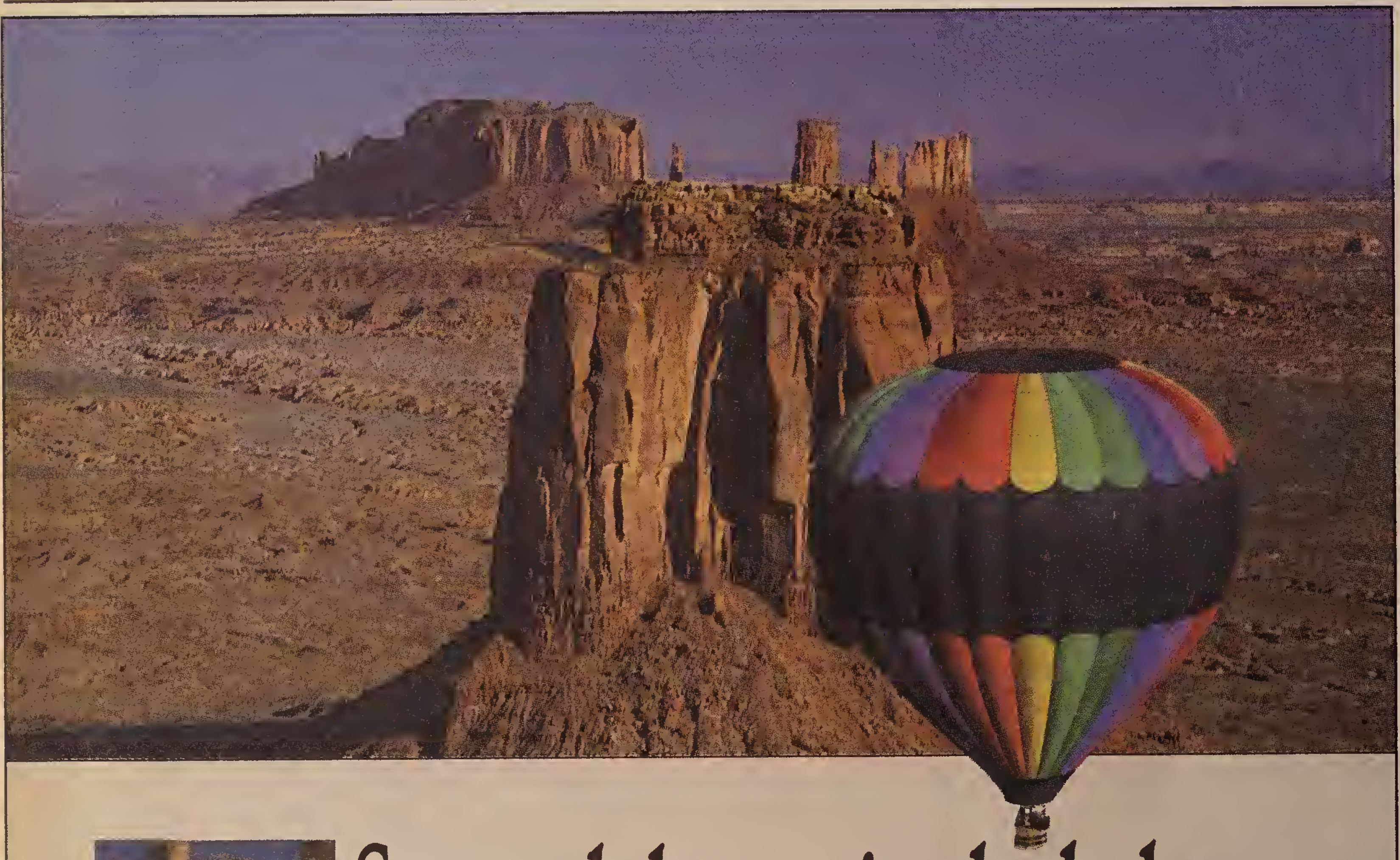
"Bridges operate at the media access control sublayer of OSI Layer 2," Hunter adds, "and therefore, should be protocol-transparent."

Routers, according to Hunter and Passmore, operate at the network layer (Layer 3) of the OSI model and use the protocol information contained within the packets to determine how packets are routed.

Brouters are limited by their ability to handle only a certain number of protocols.

Hunter and Passmore agree that it's always tied to a particular protocol stack.

"The interesting thing these days is the emergence of multiprotocol routers,"



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Passmore adds. "Vendors are beginning to package multiple routers in the same box."

Newer products that combine some of the features of bridges and routers seem to generate the most difficulty in definition.

"A brouter is actually a router that can also bridge," Hunter says. "It can route one or more network protocols and bridge all the others. This means they're transparent to the other ones."

"A brouter can simultaneously link more than a pair of LANs together," Passmore says. "A simple bridge generally ties two LANs together; a brouter is a bridge that might tie three or more LANs together. It implies some additional capability. As far as I'm concerned, the only difference is the ability to link more than two LANs together; it's a term that vendors cooked up."

In addition, there are routing bridges and bridging routers.

"Many of the router vendors have decided that it also makes sense to include bridge functionality in their routers," Passmore says. "So in addition to supporting TCP/IP and DECnet routing, they will also have something like spanning-tree bridging or source-routing bridging or both to be able to handle traffic that doesn't conform to the protocol stacks the box supports as a router."

"We're seeing bridges that will route based on protocol, packet type and packet size," Hunter adds. "They now incorporate many features associated with routers, brouters and routing bridges." (For more on bridges, routers and brouters, see "The way of routing," *NW*, Aug. 7.)

Part of the problem with confusing the terms and capabilities of various boxes isn't just the evolving technology; it's how the technology is presented by the vendors. The aforementioned "network management" is becoming a ubiquitous example.

"Network management is a good area for misunderstandings," Herman says. "Users often think they're getting a lot more than they are when buying a network management system. There is a kind of difference in perception as to how comprehensive these systems are."

He adds that part of the problem is vendor promises and the hype that surrounds network management today.

"There's a lot of overstatement of what things can really do," he explains. "My contention is that there are few areas in network technology where there's as wide a gap between what users really need and want and what they're getting, [such] as in network management. We're still developing the technology; there's a lot of good ideas, but they're still ideas."

Hetero-homogeneity

Even deciding what's heterogeneous and what's homogeneous can be a tough task. At the recent Network Management Solutions '89 show in Chicago, two net management presentations offered very different interpretations of the two terms.

A spokesman for Vendor X defined "heterogeneous" as a network made up of products from various vendors and a "homogeneous" network as a single-vendor system.

An independent consultant, citing various vendor examples, argued that even a network made up of equipment from a single vendor could be called heterogeneous if the equipment used different protocols or operating systems.

To make matters worse, an engineer from Vendor X said in a later, informal meeting with users that it was possible to have a single-vendor solution with noninteroperable but connectible equipment and applications, thus making the system heterogeneous "in a limited, technical way," she said.

"I've had vendors ask me if I would define what I was talking about when I ask them whether their products operate in a heterogeneous or homogeneous environment," Hunter says. As far as he's concerned, there is no confusion.

"Heterogeneous networks are made up of products from different vendors; homogeneous nets are from the same vendor," he asserts.

Nonstandard packets

Even the most familiar terms in data communication have basic differences, but that familiarity has bred frequent misuse or abuse. One of the most popular misuses is X.25 and packet switching.

"People equate those terms,

(continued on page 62)

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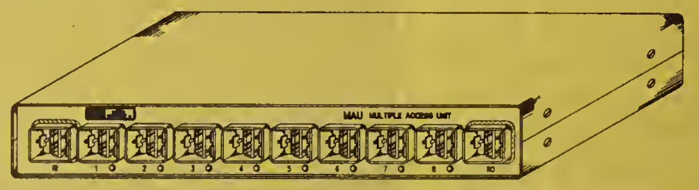

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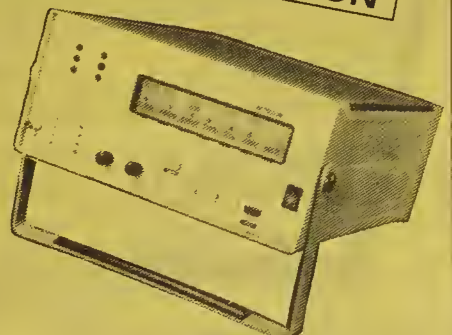

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NW 8/28

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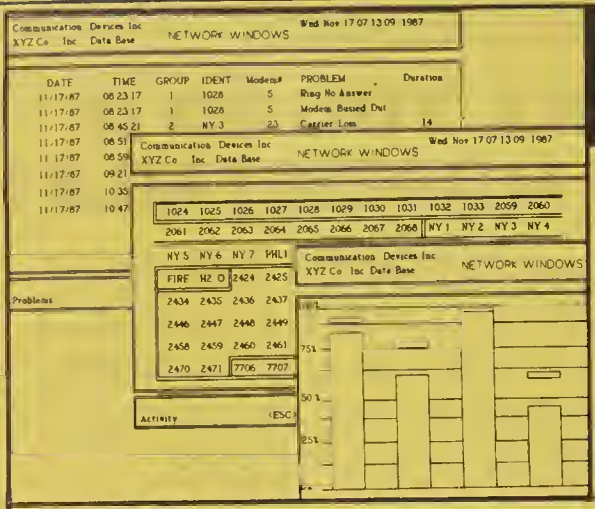

```
Communication Devices Inc                              Wed Nov 17 07 13 09 1987
XYZ Co   Inc   Data Base        NETWORK WINDOWS

   DATE      TIME   GROUP  IDENT  Modem#  PROBLEM           Duration
 11/17/87  08 23 17   1    1028     5     Ring No Answer
 11/17/87  08 23 17   1    1028     5     Modem Bussed Out
 11/17/87  08 45 21   2    NY 3    23     Carrier Loss         14
 11/17/87  08 51
 11/17/87  08 59
 11/17/87  09 21
 11/17/87  10 35
 11/17/87  10 47

Problems

 1024 1025 1026 1027 1028 1029 1030 1031 1032 1033 2059 2060
 2061 2062 2063 2064 2065 2066 2067 2068 NY 1 NY 2 NY 3 NY 4
 NY 5 NY 6 NY 7 PHL1
 FIRE H2 O 2424 2425
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 2446 2447 2448 2449
 2458 2459 2460 2461
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Activity                        <ESC>
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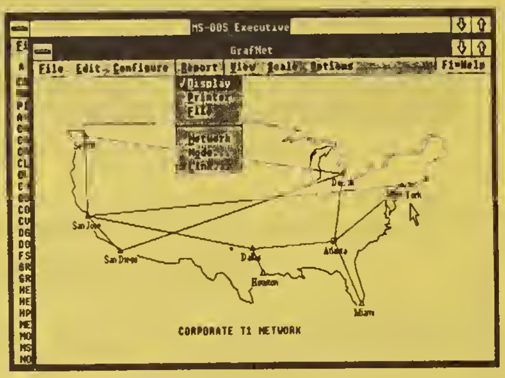

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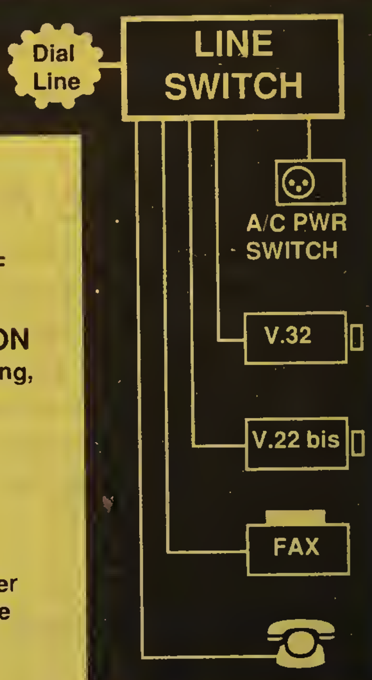

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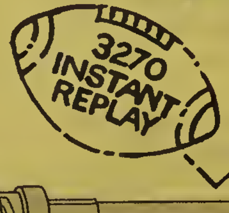

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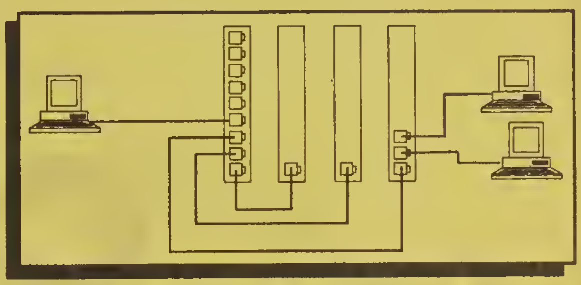

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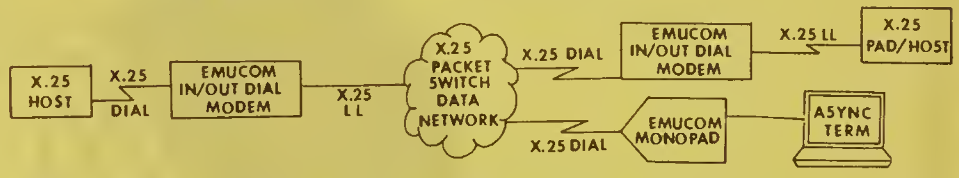

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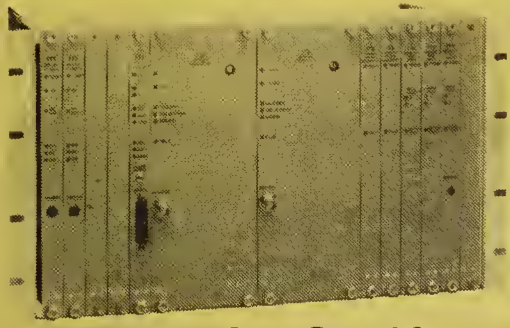

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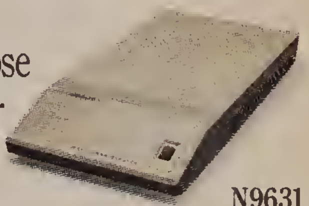

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Data service units

Vendor	Product	Data rate (bit/sec)	DTE interface	Secondary diagnostic channel	DDS-II secondary channel	Voice/data transmission	Net statistics gathered	Remote diagnostics	Price
Alcatel Network System Corp. **Raleigh, N.C.** **(919) 850-6000**	DSU-A	2,400, 4.8K, 9.6K, 19.2K, 56K synchronous; 50 to 9.2K asynchronous/ synchronous	RS-232-C, RS-449, CCITT V.35	No	No	Data	Signal loss, network status	Local and remote loop-back, card-to-card test, test pattern	$695 to $1,000
AT&T Paradyne **Largo, Fla.** **(813) 530-2000**	Model 3056	2,400, 4.8K, 9.6K, 19.2K, 56K	RS-232-C, CCITT V.35 concurrently	Yes	Yes	Data	Receiver levels, network errors	Remote loop-back, self-tests, bit error rate tests	$1,075 to $1,400
	Model 2600	2,400, 4.8K, 9.6K, 19.2K, 56K	RS-232-C, CCITT V.35	No	No	Data	Bit error rate tests	Remote loop-back	$950 to $1,095
Case/Datatel, Inc. **Cherry Hill, N.J.** **(609) 424-0303**	DCP 3056	2,400, 4.8K, 9.6K, 19.2K, 56K	RS-232-C, CCITT V.35	No	No	No	Error-free seconds, seconds in test, errored seconds	Remote loop-back, bit error rate tests	$1,950
Codex Corp. **Canton, Mass.** **(617) 364-2000**	Model 2160	2,400, 4.8K, 9.6K (optional), 56K	RS-232-C, CCITT V.35	No	No	Data	Error-free seconds, percentage of line availability	Remote loop-back, bit error rate tests	$1,250
Dynatech Communications, Inc. **East Greenwich, R.I.** **(401) 884-9075**	Accuplex 2200	2,400, 4.8K, 9.6K, 56K	RS-232-C, RS-449, RS-530, CCITT V.35	Yes	Yes	No	None	Local and remote loop-back, test pattern generator	$995
General DataComm, Inc. **Middlebury, Conn.** **(203) 574-1118**	DataComm 500C	2,400, 4.8K, 9.6K, 19.2K, 56K	RS-232-C, CCITT V.35, RS-530	Yes	Yes	Data	NA	Remote loop-back	$595 to $925
Hubbell, Inc. **Pulse Communications Division** **Fairfax, Va.** **(703) 471-2900**	T-Zero Service Unit	9.6K, 19.2K, 38.4K, 57.6K asynchronous; 56K synchronous	RS-232-C	Yes	No	Both	NA	Dial-up or manual remote loop-back	$2,500
Kentrox Industries, Inc. **Portland, Ore.** **(503) 643-1681**	TieLink 56	2,400, 4.8K, 9.6K, 56K	RS-422, RS-232-C, CCITT V.35	No	No	Both	None	Remote loop-back, bit error rate tests	$1,795
NEC America, Inc. **Data and Video Communications Systems Division** **San Jose, Calif.** **(408) 433-1200**	N500A	2,400, 4.8K, 9.6K, 56K	RS-232-C, CCITT V.35	No	No	No	Receive errors	Local and remote loop-back, 511 test pattern generator	$645 for 2,400, 4.8K, 9.6K units; $755 for 56K unit
Racal-Milgo **Sunrise, Fla.** **(305) 592-8600**	CMS DSU 1500	2,400, 4.8K, 9.6K	RS-232-C	Yes	Yes	Data	None	End-to-end loop-back, DTE loop-back, DDS checks	$1,495
	CMS DSU 1556	56K	CCITT V.35	Yes	Yes	Data	None	End-to-end loop-back, DTE loop-back, DDS checks	$1,695 for stand-alone; $1,545 for card
RAD Communications, Inc. **Rochelle Park, N.J.** **(201) 568-1466**	SPD-64	2,400, 4.8K, 9.6K, 19.2K, 56K	RS-232-C, CCITT V.35	No	No	No	None	Local and remote loop-back	$1,490
	SDM-1	2,400, 4.8K, 9.6K, 19.2K, 38.4K; up to 300 on secondary channel	RS-232-C	No	Yes	No	None	Local and network-activated subchannel loop-back, local loop-back	$3,000 to $3,500
TeleProcessing Products, Inc. **Simi Valley, Calif.** **(805) 522-8147**	TP-564	64K clear channel	CCITT V.35; CCITT V.36 optional	No	No	Data	None	None	$1,395
	Model 1	2,400, 4.8K, 9.6K, 19.2K, 56K	RS-232-C, CCITT V.35	No	No	No	None	Remote loop-back per drop	$495
Teltrend, Inc. **St. Charles, Ill.** **(312) 377-1700**	DSU 9000	1,200, 2,400, 4.8K, 9.6K, 19.2K, 56K	RS-232-C and D, CCITT V.35	Yes	Yes	Data	NA	Local and remote loop-back, bit error rate tests	$995 to $1,365
Universal Data Systems, Inc. **Huntsville, Ala.** **(205) 721-8000**	DDS/MR	2,400, 4.8K, 9.6K, 56K	RS-232-C, RS-449, RS-530, CCITT V.35	No	No	No	None	Local and remote loop-back, test pattern generator	$695
Verilink Corp. **San Jose, Calif.** **(408) 945-1199**	Adaptive Data Service Unit	1,200, 2,400, 4.8K, 9.6K, 19.2K, 32K, 38.4K, 64K	RS-232-C, CCITT V.35	Yes	No	Both	Errored seconds, severely errored seconds, failed seconds, frame loss	Remote loop-back	$2,300

DDS = Digital data service
DTE = Data terminal equipment
NA = Information not available

This chart includes a representative selection of vendors in the data service unit market. Most vendors offer other data service units, and many vendors not included offer a full range of competitive products.

SOURCE: TMS CORP., WAYNE, PA.

(continued from page 44)

prices more favorable than DDS'.

Under the current DDS tariff, for example, a 56K bit/sec line running 100, 500 or 2,000 miles costs $1,003.50, $2,163.50 or $4,593.50, respectively. In contrast, a 128K bit/sec bundle offered under Accunet Spectrum costs $533.16, $777.16 and $1,692.16, respectively, for the same distances.

Those price differences are enough to prompt many users to reach out and call for Spectrum. But wait; there are other things to consider, such as data and service integrity, service availability, new equipment and overall costs to access the fractional T-1 service.

For those who care about correcting transmitted errors, DDS is the way to go.

"DDS does a better job of catching errors," states Ken McLaurin, a product line manager with Racal-Milgo in Sunrise, Fla. "DDS transmits five redundant blocks to catch errors, [while] T-1 has no error correction." Some people mistakenly believe that the cyclic redundancy check of AT&T's ESF corrects errors, but it doesn't; it monitors the error conditions on the T-1 network.

Service integrity is another matter the "bottom-line" people may overlook as they rush toward fractional T-1. A 1,000-mile DDS circuit between AT&T points of presence (POP) has an availability of 99.95%, while a comparable Accunet Spectrum circuit is rated at 99.75%, according to AT&T. That works out to 4.38 hours or less of downtime per year for DDS vs. 21.9 hours per year for T-1. Since DDS and T-1 are frequently used as network backbones, those time differences can mean a lot.

Other fractional T-1 drawbacks are its lack of availability and the accessing costs. Accunet Spectrum service is available in about 25 local access and transport areas, while 150 locations are expected to have it next year, according to AT&T. To access the AT&T POP today, users must lease a full T-1 circuit from a regional Bell holding company and use a D4- or ESF-compatible multiplexer as the interface.

The price of the T-1 link between the user site and POP depends on the distance. As distances increase and costs mount, the attractiveness of fractional T-1 diminishes. Although neither the interface multiplexer nor its high-priced CSU is free, compared with monthly charges for T-1 lines, they're relatively inexpensive.

While DDS is enjoying a reprieve, storm clouds are gathering that could blow it away. According to AT&T's Bob Brown, product marketing manager for Accunet T1.5, "Both low-speed voice-grade line access and digital service employing DS0 access

(continued on page 60)

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(continued from page 58)

to the POP are under consideration by the [local exchange carriers]." Brown explains that the analog access will involve a 19.2K bit/sec link running from the user's premises.

With the digital service, the local exchange carrier will offer a clear-channel 64K bit/sec DS0 link to the POP. "At present, neither [analog nor digital] service is available, although New England Telephone & Telegraph Co. has announced the clear-channel 64K [bit/sec]," Brown says.

Scott Ledgerwood, director of product development for Case/Datatel, says he believes the RBHCs will jump on the fractional T-1 gravy train. "There's a lot of money to be made with fractional [T-1], and the RBHCs would be smart to get in on it," he says.

"The CSU must have the capability of monitoring the data and establishing the registers in the RAM [which are] needed to hold it and [also] have the means to report it to a carrier," Buckley states. Currently, AT&T polls the CSU to gather performance data, but under the new standard, the CSU will be required to report it automatically.

"The standard calls for approximately 200 bit/sec to be transmitted every second to the central office without [CSU] polling," Buckley explains.

AT&T, according to Brown, will implement the T1.403-1989 standard throughout Accunet T1.5, but it will take a while since AT&T currently has no equipment in place to capture and analyze the new performance data.

Still, companies contemplating the purchase of CSUs must consider whether their money will be wasted if the product is incompatible with the standard and can't be upgraded.

As Ledgerwood says, "It could require a complete redesign since it seems doubtful that a lot [of CSUs] will be field-upgradable."

John Litster, director of product development for Kentrox Industries, Inc. of Portland, Ore., a vendor that has modified its CSUs to be T1.403-compatible, says it depends on whether the CSU is Bell Publication 54016-compliant and if the circuits between the DS1 monitor and the processor reading the data can handle the new information.

"A CSU that's ESF-compatible doesn't necessarily read ESF data. It must be 54016-compliant to do that, and many older CSUs aren't. Also, the circuits between the DS1 circuit monitor and the microprocessor reading the network performance data must be capable of reading the [new] data. Otherwise, [the circuits] will have to be changed," he says.

Litster says that if the CSU has those capabilities, all that's needed is a software change to allow data reading and reporting. Vendors in this Buyer's Guide that offer T1.403 standard compatibility are Larse Corp., Digital Link Corp., Kentrox and Verilink.

Brown says he agrees that hardware and software upgrades will be needed, but he thinks the changes can be fairly painless.

"I think you'll see cards and software coming out to do the conversion," he predicts. Let's hope he's right, but users

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Advanced CSU services

Many CSUs now support bipolar eight zero code substitution (B8ZS) and ESF implemented on AT&T's Accunet T1.5 service to enhance network performance.

ESF replaces the regular T-1 12-frame superframe with one that is 24 frames long and creates two additional signaling bits in frames 18 and 24. Together, the two additional bits take 6K bit/sec from the T-1 1.544M bit/sec composite bandwidth.

The first bit is used for the cyclic redundancy check that indicates error conditions on the T-1 network, and it uses 2,000 bit/sec of bandwidth. The second signaling bit creates a 4K bit/sec data channel and is used to carry out-of-band signaling.

B8ZS allows users to get around the aforementioned 15 consecutive zero restriction imposed by Accunet. The B8ZS facility monitors the data stream for zero density violations and, when it detects them, substitutes two consecutive eight-bit byte bipolar violations. B8ZS-compatible receiving equipment recognizes those violations and converts the data back to its original transmitted format.

B8ZS, however, is not supported universally throughout the AT&T network because the M13 multiplexers used at some AT&T locations to switch data may not have been converted to pass B8ZS. Brown says he isn't sure of the M13s' status within the network but states that "all equipment installed during the past five years is B8ZS-compatible."

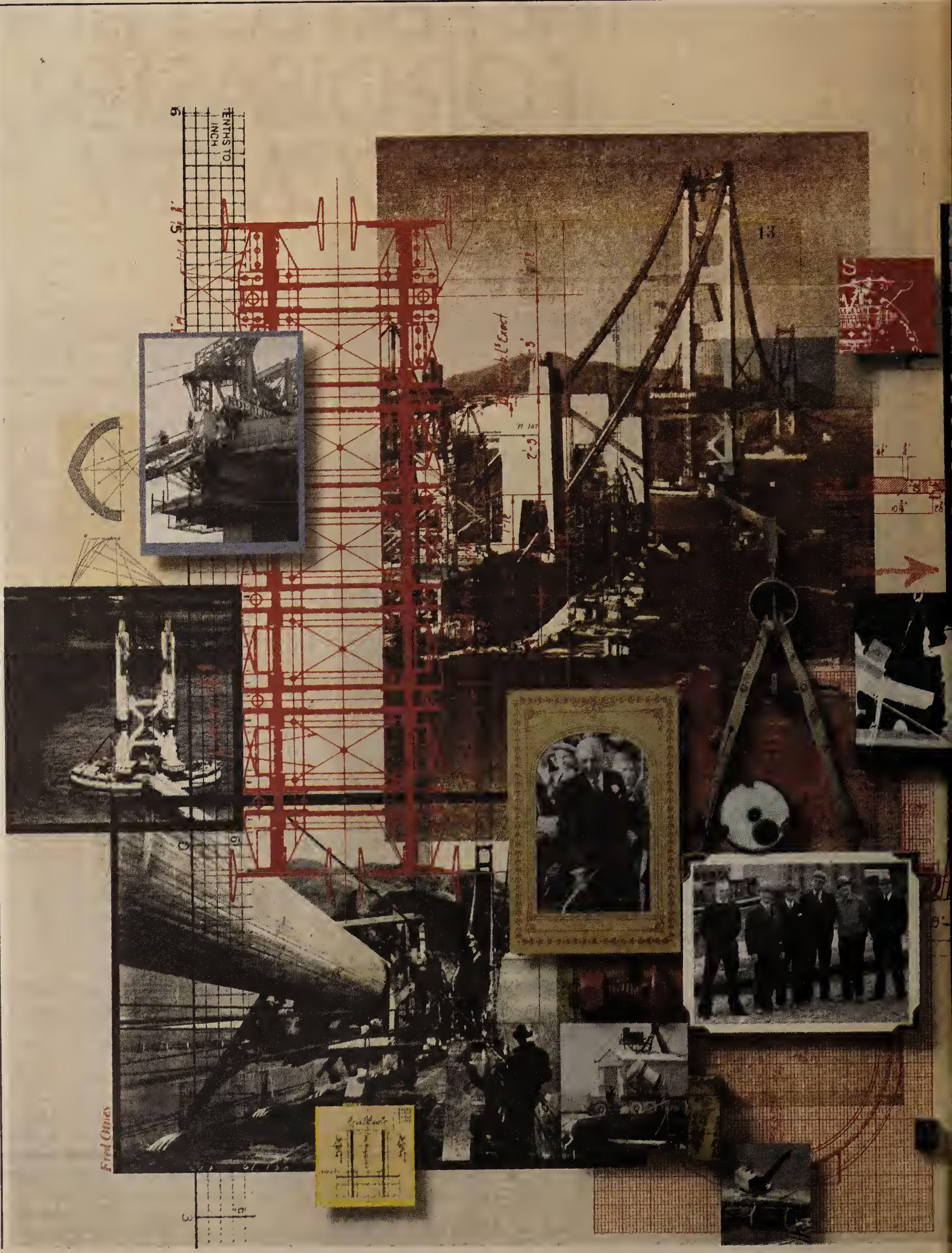
Since AT&T's policy on M13 conversion has been on a repair-as-needed basis or when new carrier systems are required, not much equipment has been exchanged. But Brown claims that if a user wants B8ZS, AT&T will handle it.

"We'll route circuits around M13s that are not [B8ZS]-compatible," he says. (All the CSUs listed in the chart on page 40 are B8ZS-compatible.)

Many CSUs obsolete

ANSI has adopted a standard for ESF that will greatly impact the level of diagnostic data that can be collected by AT&T's Accunet T1.5 facilities and will obsolete many CSUs now being sold unless they can be upgraded. Called ANSI T1.403-1989, the standard is the work of the T1E1 committee of ECSA and is supported by Bell Communications Research, Inc.'s Technical Advisory TA-TSY-000147.

Verilink's Buckley says that with ANSI T1.403-1989, CSUs may be required to gather statistics on clock synchronization errors and framing errors, in addition to the errored seconds, severely errored seconds, failed seconds, bipolar violations and so forth now required from existing CSUs.



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(continued from page 36)

sales agent promises "complete privacy."

The Association of North American Radio Clubs surveyed cellular carriers about the issue and was assured privacy of communications by each of the companies it contacted.

In fact, a representative of Bell Atlantic Mobile Systems told the group that cellular telephones are more private than standard land-line phones. Similarly, a customer service agent for a cellular telephone company in Austin, Texas, claimed that only the local police department's narcotics division was capable of eavesdropping on cellular calls.

On the other hand, the industry has sought help from both Congress and the FCC to solve the privacy problems it refuses to acknowledge. In testimony before the Subcommittee on Courts, Civil Liberties and the Administration of Justice of the House Judiciary Committee, John Stanton, a member of the Telocator Network of America, a major trade organization, urged Congress to adopt the ECPA. He suggested that the absence of this type of law has inhibited the growth of the cellular industry.

An official of Tandy testified that "extension of privacy coverage [in the ECPA] to cellular communications will help ensure the continued growth and vitality of the cellular industry."

The same argument was used to attack the FCC's proposal to require warning labels on cellular telephones. McCaw Cellular Communications, Inc., a leading cellular operator, told the FCC that requiring labels would thwart the commission's policy of promoting the provision of cellular services to the public.

In other words, the industry has fought hard to make sure that the public perceives cellular telephones as being fully private. In addition to their promotional claims about secrecy, cellular interest groups have lobbied the government to avoid any official pronouncements that would contradict those claims.

This also explains the industry's prominent support of the ECPA. The act was an update of a federal wiretapping law designed to account for changes in technology protecting such matters as computer transmissions and electronic mail. The industry lobbied for — and received — inclusion of cellular telephone calls under the new law's protection.

In short, cellular interests won a federal seal of approval purporting to guarantee the privacy of their products.

A false impression

Does this make a difference? Perhaps it does in terms of public perceptions — as the industry hoped — but the law has absolutely no effect on the security of cellular telephones. In fact, the ECPA could result in less privacy because it tends to create a false sense that no problem exists.

Ironically, Congress understood the ease with which radio-telephone conversations could be intercepted when it enacted the ECPA and denied protection to those technologies considered to be too vulnerable. For example, the law does not cover cordless telephones because their transmissions are considered to be "readily accessible to the general public."

Cordless telephones use radio frequencies to transmit a signal between the handset and a base unit, and they typically have a range of a few hundred to 1,000 feet. A conversation over a cordless telephone may be overheard on a neighboring phone if it is tuned to the same frequency or even by a standard AM radio.

The House Judiciary Committee noted that "because the communications made on some cordless telephones can easily be intercepted with readily available technologies (such as AM radio), it would be inappropriate to make such interception a criminal offense."

> The industry has fought hard to make sure that the public perceives cellular telephones as being fully private.
>
> ▲▲▲

Why the different treatment for cellular telephones? After all, 800-MHz scanners are commercially available, and standard television sets may be tuned to cellular frequencies. Perhaps the answer lies in Congress' belief that cellular technology is inherently more secure.

Cellular technology derives its name from the fact that the telephone service area is divided into a number of geographic regions, called "cells," each with its own low-power transmitter.

When a cellular telephone is in a given cell, it utilizes the frequencies assigned to that region but then is "handed off" to a new frequency when it passes into the next cell. Theoretically, changes in frequency on hand-off thwart attempts to conduct surveillance on cellular calls.

In practice, the theory has not worked so well. Cells currently are fairly large, making hand-off infrequent. In addition, the stop-and-go traffic in most urban areas further limits frequency changes.

Those who report overhearing cellular calls suggest that they are able to hear entire conversations in most instances. Even when hand-off occurs, scanner users report that in times of fairly light telephone traffic, they can pick up the same call quickly by scanning through the channels.

Whether or not the phenomenon of hand-off creates a greater expectation of

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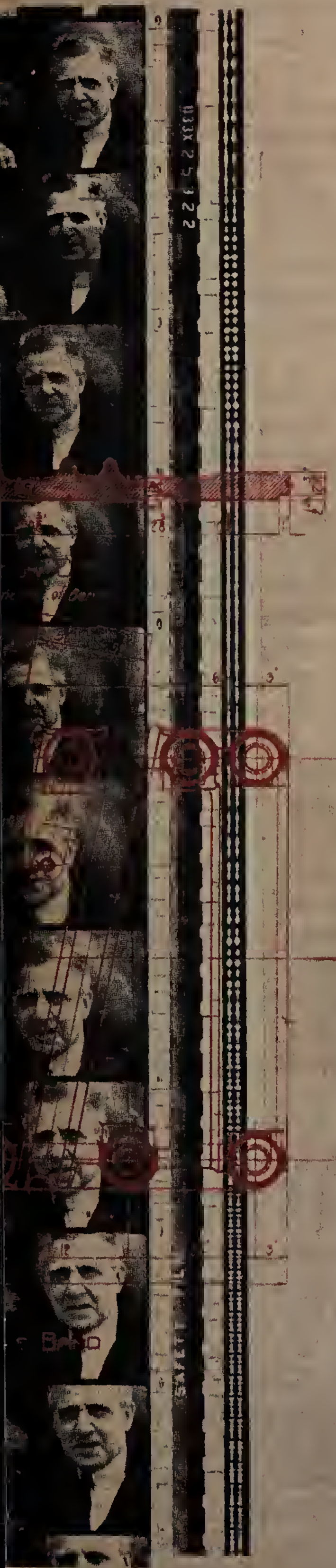

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(continued from page 47)

but they're not necessarily one and the same," Passmore says. "Somebody usually specifies in an RFP that X.25 must be used between the switches, and nobody does that. X.25 provides an external interface to the packet-switching network; all the vendors use their own protocols between the switches."

Even in a so-called homogeneous network, misuse or misunderstanding of this distinction can cause problems.

"It could cause problems if somebody wanted to procure PADs and switches from different vendors because some vendors use X.25 between their PADs and switches, and others use their own proprietary protocol," Passmore says.

Another age-old conflict is between bit rate and baud. Which would you rather have: a modem operating at 2,400 bit/sec or at 2,400 baud? For the same price, most people would take the latter, as it could push data through at several times the rate of the former.

"9.6K baud is not 9.6K bit/sec," Hunter says. "I wouldn't mind a 9.6K baud modem. I've seen lots of literature with data rates given in baud; in some cases, you have to call and verify which it should be. Some of the rates quoted — 1,200, 2,400, 4.8K or even 9.6K — could conceivably be baud, but they're not."

Bit rate is the amount of data sent through a modem in a second. A 9.6K bit/sec modem transmits 9.6K bits per second (assuming no compression).

Baud rate measures in the number of signaling elements, or symbols, transmitted by one modem and received by another.

Advanced encoding techniques used today allow several bits to be encoded in one signaling element. Thus, if the element contains eight bits, a 9.6K baud modem would be sending 76,800 bits every second, an advantage of 67,200 bits over the 9.6K bit/sec modem.

A failure to communicate

So how is it that in an industry that demands such precision and devotes so much time and effort to developing standards, the very terms defining how things are done are so easily misunderstood? It could be the technology itself, or it could be a simple lack of understanding between parties.

"The user misperceptions are on exactly how complicated the technology is," Herman says. "Conversely, there are some areas where vendors still misinterpret what users' real needs and requirements are."

"In some cases, people have gotten to the point where they use terms too loosely, and whatever the definitions were, [they] have been lost because of misuse," Hunter says. "People just get sloppy or even lazy in their misuse of terms."

Since it would be nearly impossible, and probably unconstitutional, to force everybody to use the same dictionary, what can users do to protect themselves from the effects of the confusion?

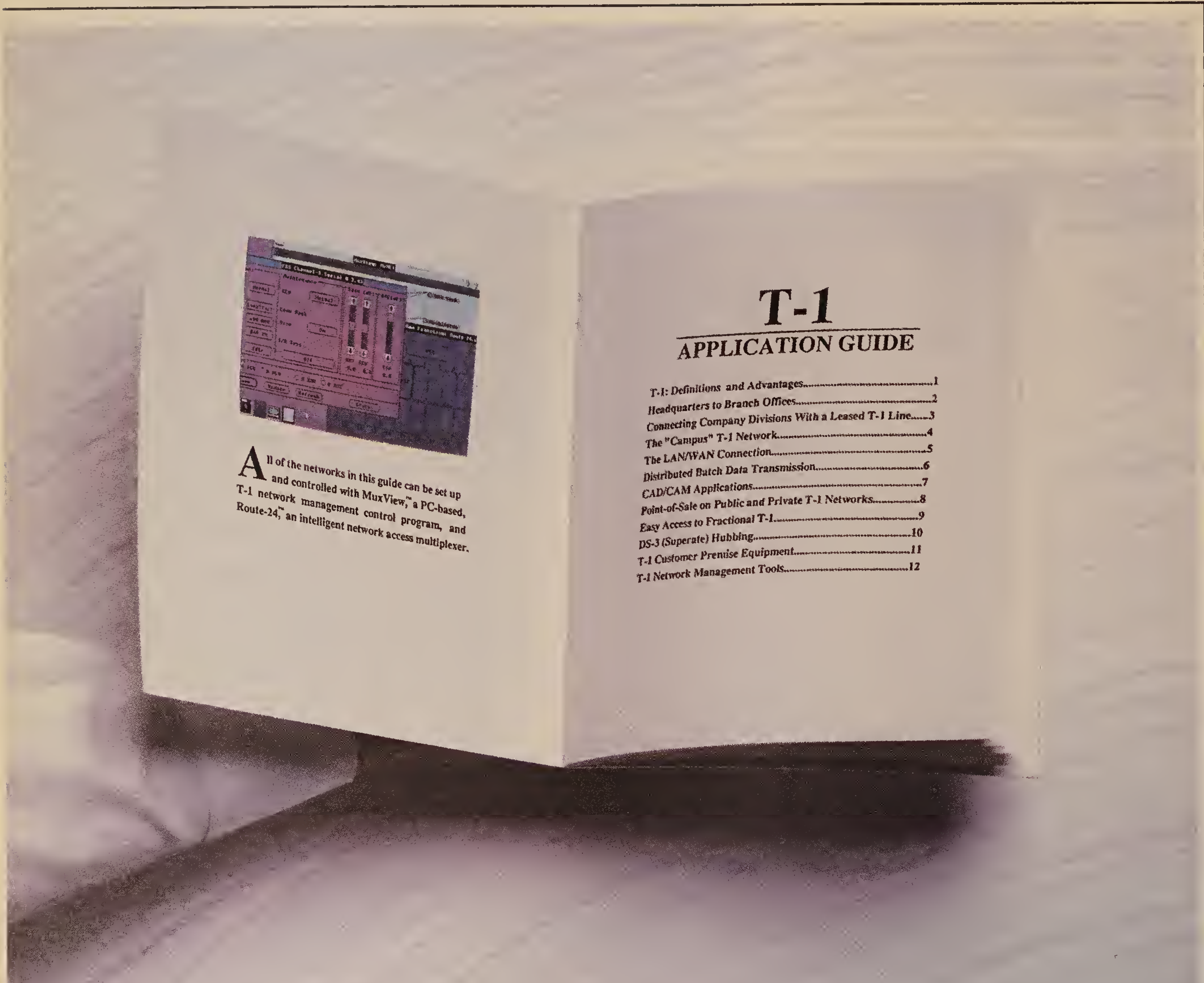
"Have the vendor or the people writing the RFP define all terms up front, within the RFP," Hunter suggests. "We see this in some of the more highly technical RFPs. Also, require the vendor to define its terms."

"I think the best advice for a user is to be as specific as you can," Passmore adds. "Put yourself in the salesman's shoes. He has products to sell and wants to be able to say they meet your specs. So think about all the tricks that he might play in order to meet them."

"I think you're better off leaving the actual definitions until you get down to 'best and final' stuff," TMC/CTG's Vandervoort says. "My feeling is to constrain the vendors as little as possible. Certainly, set up baselines and minimum acceptable criteria, but don't try to come up with rigid forms for vendors to fill out. If you put a line in the RFP that asks 'What is your network response time?' they're not going to fill it out the same way.

"What you're really trying to do is get a system solution in place, so the best thing to do is to have an evaluation," he says. "Have a shoot-out. Bring in the top three or four vendors and set them up in-house. Run as close to real-world stuff over it as you can, and see who does better in your world."

That's the important part: It's *your* world, and you should do the defining. Just make sure everybody is speaking the same language. ◻



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You'd better shop around

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should check with prospective CSU vendors regarding upgrades before any money changes hands.

Companies that need only plain vanilla DDS or T-1 services have a fairly simple task: Just pick a product with the right diagnostics and the right price from a reputable vendor. But remember, if a company has a multivendor product policy and the network will comprise heterogeneous products, the units may not have compatible diagnostics, and therefore the troubleshooting facilities will be greatly diminished.

In the past, some companies were stymied by Accunet T1.5's zero density requirement. However, with the introduction of B8ZS and the change in the laws governing what can and cannot be put on the public network, zero density may not be a problem any longer. Users should note that there's some uncertainty whether a data stream with more than 15 consecutive zeros will experience performance problems.

Buckley says he believes problems will occur, though AT&T claims that its new gear will have no problem handling extended zeros. Of course, the big question is how much new equipment has been deployed throughout the Accunet T1.5 network, but AT&T's Brown couldn't offer a percentage.

The availability of M13 multiplexers capable of handling B8ZS is another questionable area. Although AT&T says it will bridge around any multiplexer that can't handle B8ZS, what will be the price in performance and cost?

When regulations such as the ANSI T1.403-1989 standard come out, network planners and administrators will have a difficult time dealing with the impact it will have on their facilities.

T1.403, like ESF, will furnish the carrier with information that will help enhance network performance, and that's good. However, there's nothing to indicate that the RBHCs will receive it any more warmly than ESF (which they cold-shouldered) and install the gear needed to analyze the performance data concerning the local loop. It is hoped they will since many communications line problems occur there.

While T1.403 may be the monitoring standard of the future, AT&T has been enhancing ESF to provide better services, according to Brown.

"We're currently testing features that will furnish customers with end-to-end performance data and sectionalized alarms in real time. The customer will be able to narrow [down] problems between carrier access points and on interoffice channels, as well as know in which direction the error is occurring," he says.

Brown claims that the new facilities will be under controlled introduction until the end of the year and that they will be generally available in the first quarter of next year.

While those extended services and the promise of the T1.403 standard are encouraging, RBHC participation is still the missing link. And users stuck with obsolete CSUs may well wonder, "What's in it for me?" ◼

It's no secret

continued from page 61

privacy, Congress accepted the industry position and included cellular telephones within the ECPA's protection. At the same time, Congress recognized the inherent vulnerability of cellular phones. So it did the next best thing to exempting cellular phones altogether — it drastically reduced the penalties for cellular eavesdropping.

Usually, a person convicted of conducting illegal surveillance under the ECPA could be fined $250,000, imprisoned for five years or both. For intercepting a cellular call, Congress set the maximum penalty at $500, so long as the surveillance was performed as a Peeping-Tom act and not for some other illegal purpose such as industrial espionage.

In addition, the Department of Justice hinted broadly during legislative debates on the ECPA that it would not enforce the provisions outlawing cellular interceptions and went so far as to tell some Congressmen it had "no intention" of enforcing the law.

Not that this should make much of a difference. Enforcement in the cellular context is not very practical since it is impossible to detect someone listening in on a cellular call.

Understandably, the law has been criticized for providing no real solution. Shortly after the ECPA was passed, Rep. Michael DeWine (R-Ohio) told the *Wall Street Journal,* "The bottom line is that people who use cellular phones have no more protection under the law than they did the day before the law went into effect. It is illusory protection."

A recent article in the *New York University Law Review* reaches the same conclusion. It notes that "with or without the ECPA, persons who do not want their cellular mobile telephone conversations to be overheard are well-advised to scramble communications, avoid discussion of sensitive topics over the air or find a more secure communications medium."

For all practical purposes, the FCC has reached the same conclusion. In rejecting the proposal to put warning labels on cellular telephones, the commission did not dispute the fact that cellular conversations may be intercepted easily. Instead, the FCC found that "a warning label, by calling attention to a prohibited activity, might encourage it."

In other words, the most effective way to maintain the privacy of cellular communications is to keep its vulnerability a secret. Unfortunately, it's too late for that. ◼

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Fate of HLLAPI uncertain

continued from page 2

last week announced it is shipping a version of HLLAPI that supports applications on Unix-based workstations.

Users will continue to use HLLAPI in cases where they have an existing, 3270-type mainframe application and want to provide a simple front end on the personal computer, said Amory Gabel, technical consultant with Digital Communications Associates, Inc. DCA makes the Irma line of terminal-emulation products, which support HLLAPI.

"The biggest advantage is you don't have to make any changes or do any rewrites to existing mainframe applications" when using HLLAPI, said Donna Singletary, manager for developer services at DCA.

But that is where the issue grows cloudy. Some users and analysts claim HLLAPI does, or at least may, require changes to the mainframe portion of an application. Thus, they claim that users should tailor the application for LU 6.2 to achieve the full benefit of cooperative processing.

"My personal experience is you always end up having to change the host applications to make them work with HLLAPI," said Joe Mohen, Systems Network Architecture networking specialist at Teleprocessing Connection, Inc., a Garden City, N.Y., consultancy.

"If you're making changes to the host application to support HLLAPI, it's a lot simpler and a lot smarter to make the same changes to support APPC instead," Mohen said.

APPC, because it is device-independent, gives a workstation user access to applications residing on any device in a network, not just mainframe applications, Mohen said.

In addition, it requires less overhead than HLLAPI and provides better performance.

Mohen's comments were echoed by some users. "You've got to be cautious not to develop new applications using [HLLAPI]. You would prefer to use cooperative processing," said a user who requested anonymity.

The user said the HLLAPI applications at his company required no mainframe application tailoring.

But he said the workstation side of the HLLAPI program requires changes whenever there is the slightest modification in the format of the 3270 data screens. Such changes commonly occur when there is an operating system upgrade, he said.

Another user had the same complaint about HLLAPI but said he has no plans to discontinue its use. David VanderMolen, senior engineer at a Dow Corning Corp. plant in Elizabethtown, Ky., said he uses HLLAPI to support automated data entry from process control computers to mainframe-based applications through an unmanned personal computer.

Some of Dow Corning's HLLAPI applications send a bit-by-bit duplicate of the various 3270 screens, automatically including what the operator would have keyed in when logging onto a 3270 application. Such an application requires no mainframe tailoring, he said.

But those are the applications that are subject to changes if the 3270 screen format is changed. To get around that, Dow Corning has other HLLAPI applications that send a stream of data, which represents all the information necessary to log on to the 3270 application. That requires tailoring the mainframe side of the application to interpret the stream, VanderMolen said.

The company sees no advantage to migrating all its applications to LU 6.2 at this time, although it is investigating that option, he said.

Dick Kanerer, IBM senior planner for OS/2 Extended Edition in IBM's Austin, Texas, programming center, said IBM has taken LU 6.2 into account with its most recent version of HLLAPI. Expanded HLLAPI (EHLLAPI), due out in November, works with OS/2-based workstations and adds support for LU 6.2.

"EHLLAPI lets you take today's existing HLLAPI applications and port them to OS/2 Extended Edition," Kanerer said. "I don't think you're going to find that HLLAPI goes away. It'll probably be around forever."

IBM vows to lead OS/2 LAN charge

continued from page 1

first System Application Architecture product — was being introduced first on LAN Server networks of OS/2 Extended Edition and DOS workstations, not for MVS- and VM-based hosts.

Dan D'Elena, OfficeVision/2 product manager, said this decision was made in response to two key customer requirements. Users told IBM that such a product was unlikely to be accepted unless:

- First, it could be based on local networks.
- Second, that those local nets can have a preponderance of DOS, not OS/2, workstations.

Getting the seven OfficeVision applications plus networking software into the 640K bytes of conventional DOS memory was a big challenge, D'Elena said. It also represented a major concession to user demand for IBM, whose enterprise-networking strategy is based squarely on the establishment of OS/2 Extended Edition as the standard corporate desktop computing environment.

Expensive memory

DOS is turning out to be much more resilient than anyone imagined when OS/2 was introduced more than two years ago. Memory prices remain stubbornly high, making upgrades from DOS to OS/2 prohibitively expensive.

Moreover, the current generation of OS/2, designed for the Intel Corp. 80286 microprocessor, won't do what most users want it to do — run multiple DOS applications concurrently. Consequently, OS/2 has been a commercial failure to date, despite all IBM's and Microsoft's considerable marketing efforts.

That has left IBM rather empty-handed because the first two releases of LAN Server don't support DOS workstations the way LAN Manager does. DOS clients are linked to LAN Server in a roundabout way, using a second server with IBM's PC LAN Program. To win converts to OS/2, IBM and Microsoft will have to make OS/2 better than DOS at running DOS applications, said Michael O'Dell, a product manager in IBM's Distributed Systems division.

IBM and Microsoft are also making a concerted "effort to drive toward consistency between IBM's LAN Server and Microsoft's LAN Manager," O'Dell said. Such consistency is needed if third-party developers are to be persuaded to allocate resources toward developing applications for OS/2 networks.

LAN Server now supports 89 of the 107 LAN Manager application programming interfaces (API). The primary areas of difference that remain involve security and printing.

O'Dell said differences in the way the two products control user access to the network are critical and must be resolved. "We [IBM and Microsoft] have to fix that, and we will," he said.

However, the issue of printing is something of a standoff. Microsoft has developed a special LAN Manager print spooler, and IBM uses the print spooler developed for the OS/2 Presentation Manager. To come up with uniform printing APIs for LAN Server and LAN Manager, "one of us would have to throw out our print spooler," O'Dell said.

This issue illustrates the dilemma IBM and the various LAN Manager OEMs are faced with as they attempt to add value to their products while still maintaining compatibility with one another.

IBM's uses a total-system approach to add value. "While others have gone after the work groups, our approach all along has been to design for the enterprise," O'Dell said. "That has hurt us along the way."

Letters

continued from page 31

1961. But the subtle things are still there, and women are still denied opportunities.

My experience over the years has been that the women I have worked with generally have been better prepared, have better work habits, have good attendance records and work just as hard as their "fellow" workers. Denying such a person a job or a promotion because of her gender is not just morally and legally wrong, it is bad business, stupid and should be considered a failure to properly carry out one's job.

I feel *Network World* has erred in publishing such a cartoon because these reactionary and stupid attitudes toward women need no reinforcement.

Ralph Brandt
Independent consultant
York, Pa.

Editor's note: Far from condoning inequality between men and women in the networking profession, the cartoon was intended to draw attention to the absurdity of the inequities that exist today.

The price is right?

I found the article ("B-2 flies through design stage with CAD/CAM net," *NW*, July 31) about Northrop Corp.'s computer-aided design and manufacturing network very interesting, but you quote a price per copy of the B-2 that is a fraction of the number I've read in other sources. Your number is $274 million; the *Washington Post* says $640 million (give or take a few hundred million). Could it be that the lower number is Northrop's cost and the difference is the profit per unit?

Michael O'Hara
MCI Telecommunications Corp.
Washington, D.C.

The $274 million price tag for each B-2 bomber was the figure we received from Northrop officials. The higher figures most other publications reported probably were derived by dividing the total cost of the B-2 program ($70 billion) by the total number of planes the program will produce (132). This results in a per-unit cost of about $530 million.

Northrop officials said each B-2 plane will cost $274 million to manufacture, but other preproduction costs, notably for research and development, are added to calculate the program's total cost. They wouldn't reveal the amount of profits.

— Editor

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Firm to acquire Anchorage telco

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business, government and residential customers, according to Frank Biondi, acting general manager of ATU. The network includes seven Northern Telecom, Inc. DMS 100 central office switches and two Northern Telecom DMS 10s. ATU switches are linked via fiber and are currently being upgraded to support Northern Telecom's latest central office switch software.

Before it can be finalized, the deal requires approval by 60% of the city's voters in an election scheduled for Oct. 3. It also requires regulatory approval from the Alaska Public Utility Commission and the Federal Communications Commission.

Under terms of the agreement, Vancouver, Wash.-based Pacific Telecom cannot lay off or transfer any full-time ATU employee for five years. More than 500 of ATU's 682 employees belong to the International Brotherhood of Electrical Workers.

Ted Berns, vice-president and secretary of Pacific Telecom, said his company serves 68 communities in Alaska with 54,000 access lines. "The purchase of ATU makes an excellent addition to our existing base there," he said.

The agreement stipulates that for five years, Pacific Telecom cannot request rate increases beyond those already approved by Anchorage's Municipal Assembly and that Pacific Telecom cannot fund any of the purchase price of ATU through increased rates.

In April, the Municipal Assembly issued a request for proposal to 140 firms and advertised in nationwide publications for the sale of ATU, setting a minimum price of $400 million.

Mayor Tom Fink had previously stated that private enterprise should run the company, Gay said. Although other organizations expressed interest in purchasing the utility, Pacific Telecom was the sole bidder, he said.

Since its inception in the 1930s, ATU has been owned by the city, Biondi said. Its 1998 revenue was approximately $100 million, Gay said, with net income reported at $4.2 million.

"They have a modern, fully digital net," Berns said. "We look forward to a lot of new services."

The agreement states that for five years, Pacific Telecom cannot request rate increases beyond those already approved.

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Pacific Telecom owns local phone companies in nine states. An interexchange subsidiary, Alascom, Inc., provides long-distance service within Alaska and from Alaska to the continental U.S. Pacific Telecom's international long-distance companies provide service to over 80 countries, Berns said. It employs 4,300 people and has a total of 240,000 access lines.

Total revenue for 1988 was $552 million, with net income of $58.4 million. In the second quarter of this year, the company earned $16.1 million on revenue of $160.2 million.

NTI gives up on data net system

continued from page 1

continue to manufacture or market that product," a Northern Telecom spokesman said. "We will attempt to place the 450 people [involved with DNS] in other divisions or provide outplacement assistance.

The time factor

"The decision was based on what it was going to take for us to complete the project — to provide all the functionality we wanted to provide," he said. "We weren't going to be able to do it in the time frame we needed."

Northern Telecom said it is committed to supporting its two current DNS customers. "We are talking to them about alternate avenues of providing the same capabilities. It's really going to come down to what the customers want us to do," the spokesman said.

One early DNS beta-test user cut the test short and shipped DNS back to Northern Telecom early this spring.

"Some of the features we needed weren't on the development agenda in the time frame we needed them," said John Scoggins Jr., supervisor of network systems for Delmarva Power & Light Co.'s Information Systems Division. "That was the main reason why we cut the test short.

"We tested DNS for nine months and had performance problems with the product. It just didn't meet our needs," Scoggins said. He said the beta-test agreement he signed with Northern Telecom precludes him from discussing specific problems with DNS.

"DNS was [Northern Telecom's] big hope to get into the wide-area networking market," said Ian Angus, president of Angus TeleManagement Group, Inc., a Pickering, Ontario-based consulting firm. "Northern Telecom has simply proven itself incapable of getting into the data business."

DNS was intended to enable users to build utility networks integrating a wide range of resources. DNS nodes supported a battery of interfaces for terminals, workstations, host computers, local nets, PBXs and other devices.

The nodes could then be interconnected on a wide-area basis with different transmission options, including X.25 packet nets and leased lines. Northern Telecom had planned to add support for T-1 to the list of connectivity features.

Looking for large users

DNS was to be marketed to large users and systems integrators, including the Bell operating companies ("NTI advanced data network set to bow," *NW,* Oct. 24, 1988).

Timothy Sullivan, onetime vice-president and general manager of Northern Telecom's Data Communications Systems division — which was created to develop DNS — two weeks ago accepted a new position as vice-president of marketing for data networks in the company's Nashville facility.

"One of his responsibilities in the new position is to refine the company's data networking strategy and work to implement that across the company and its different product lines," the Northern Telecom spokesman said.

Northern Telecom will announce its new data networking strategy in the next 30 to 45 days, the spokesman said.

The company said it had $20 million worth of orders for DNS, which costs $50,000 to $90,000 per node depending on configuration. Northern Telecom declined to say how many DNS nodes it has shipped.

DNS was built on a proprietary platform based on the former DV-1, a Northern Telecom office automation system introduced in 1985 that is now only sold for special niche applications, according to the spokesman.

But Northern Telecom says potential DNS customers are looking for a different platform.

"The market is telling us that for the kinds of capabilities and value-added services we are attempting to provide, [it] would prefer to see them delivered on an industry-standard platform," the spokesman said.

MCI to manage Merrill Lynch net

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there was no financial advantage. Instead, Merrill Lynch will maintain and service the network equipment itself.

The source also said Merrill Lynch is considering two bids to have carriers buy back its AT&T 5ESS switches, one from MCI and Nynex Corp., and the other from AT&T and New York-based Teleport Communications.

If Merrill Lynch opts to sell the 5ESS switches, the source said they likely would remain on Merrill Lynch premises in Manhattan and would serve the brokerage firm and any other users the carrier wants to support.

Undersea fiber heralds low rates

continued from page 6

"We've been offered $20,000 [per month] for a fiber-optic T-1, and we expect to actually get it for about $15,000," said a network planning manager at a major New York brokerage firm who requested anonymity. The going rate for an equivalent satellite circuit is about $30,000.

"Unless satellite rates drop, customers will desert it like rats jumping off a sinking ship," the source said.

Price war

As a result, according to users and analysts, a price war is in the offing.

Fueling the war is a potential glut in international capacity, as a series of higher capacity satellites and at least 11 U.S.-based transatlantic and transpacific fiber-optic cables come into service by 1996.

Sunil Tagare, director of the undersea consulting group of Kessler Marketing Intelligence Corp. in Newport, R.I., predicts that global capacity will increase at an average annual rate of about 40%, rising from approximately 600,000 voice-grade circuits at the end of 1988 to approximately 2½ million circuits in 1996.

Demand to rise

Meanwhile, according to Tagare, demand for international services — which he said is dictated mostly by business expansion — will rise between 9.5% and 19.5% annually, from approximately 100,000 voice-grade circuits at the end of 1988 to just under 500,000 by 1996.

The result will be a capacity glut of roughly 2 million unused voice-grade lines by 1996 (see graphic).

Stuck with excess capacity, international service providers will begin feeling pressure to cut prices in an effort to increase demand, Tagare said.

Those price cuts will be made possible by the relatively low cost to carriers of providing services over undersea fiber-optic cables.

Dividing total capacity by the cost of installation, Tagare figures that it costs AT&T $900 per year for each voice-grade circuit offered over its Trans-Atlantic-7 (TAT-7) coaxial undersea cable, which was laid in 1983.

Tagare put the expense for a single voice circuit over TAT-8 at $370, and the cost for a single voice circuit over the Private Trans-Atlantic Telecommunications undersea fiber cable at $165.

At these prices, Tagare said it is currently less expensive for carriers to provision transatlantic connections over fiber cables than via satellite. The same thing will be true for transpacific communications by 1992, he said, as a series of new undersea cables comes on line.

According to Tagare, the upshot is that by 1996, average prices for all international communications services will be between 22% and 40% less expensive than current rates.

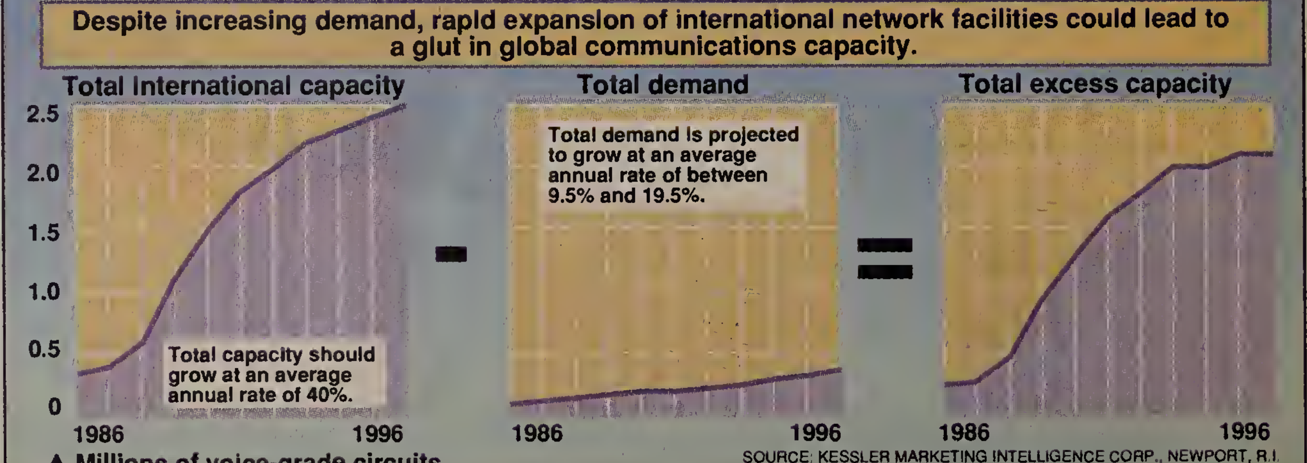
Rates will drop most where the greatest number of undersea fiber-optic cables are laid and competition is fiercest, Tagare said. Transatlantic communications could experience the biggest reductions.

Meanwhile, most users said they are already benefiting from the new economics of undersea fiber-optic cables.

"There's no doubt that a glut is developing out there," said Andrew Sokolov, senior vice-president for communications systems at the New York-based brokerage firm Shearson Lehman Hutton, Inc. "And we're definitely seeing better pricing because of it."

Anatomy of a glut

Despite increasing demand, rapid expansion of international network facilities could lead to a glut in global communications capacity.



SOURCE: KESSLER MARKETING INTELLIGENCE CORP., NEWPORT, R.I.
GRAPHIC BY SUSAN J. CHAMPENY

User high on ISDN despite cutover woes

continued from page 1

office operations for John Hancock. "They weren't working as a single group."

The AT&T implementation staff had little or no prior experience with ISDN installation, Hastings said.

Prospective ISDN "users should have their local AT&T people guarantee they will bring in people with previous ISDN experience for these projects," he recommended.

The ISDN Primary Rate Interface links John Hancock's 16-module System 85 private branch exchange serving the John Hancock skyscraper and two other buildings to an ISDN-compatible AT&T 4ESS central office switch in Cambridge, Mass. The company refused to accept the circuit until it met preestablished requirements and then tested it for five full days.

One of the first steps the company took after accepting the Primary Rate Interface link was to adapt its System 85 and two adjunct processors, used to collect and process call records, to support ISDN's automatic number identification (ANI) feature. ISDN call records are larger than usual because they contain ANI information.

Stephen Kelley, telecommunications director at John Hancock, said the adaptation was inexpensive but labor-intensive because the three systems are located in different buildings and had to be changed simultaneously.

In a few days, the company's billing system will produce the first reports containing ANI data. "We're not 100% sure that everything is in place to support this," Kelley said. "We'll just have to wait and see."

With the billing system in place, the company will be able to focus its efforts on developing ISDN applications.

> The AT&T implementation staff had little or no prior experience with ISDN installation, Hastings said.
>
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"There are hundreds of different ways we can use ISDN," Kelley said. "Although the technology is embryonic, we expect a cascade of new ISDN products over the next few years."

ANI advantage

The company, for example, is thinking about using ANI to speed up the process of giving callers updates about insurance claims.

The telephone numbers of callers would be forwarded over the ISDN link and compared to an on-line data base of customers. When a match is found, the call would be forwarded with the customer's data file to a waiting agent.

"Even if we only get ANI for 60% of our calls, we'll still be able to provide personalized customer service," Kelley said. It would also enable the company to recognize the calls of its largest policy holders and pass them to a priority queue.

John Hancock plans to implement this application across the country. The company has eight AT&T Definity 75/85 Communications System Generic 1 PBXs scheduled for October installation at major field locations — several of which will be equipped with the ISDN Primary Rate Interface.

The Primary Rate Interface-compatible PBXs may eventually support an array of ANI-based applications. Kelley said the company, for example, could run call-in promotions, collect ANI data and analyze response by geographic region. It could also set up an 800 number people could call to get information about high-yield investments and collect the ANI data to use as sales leads.

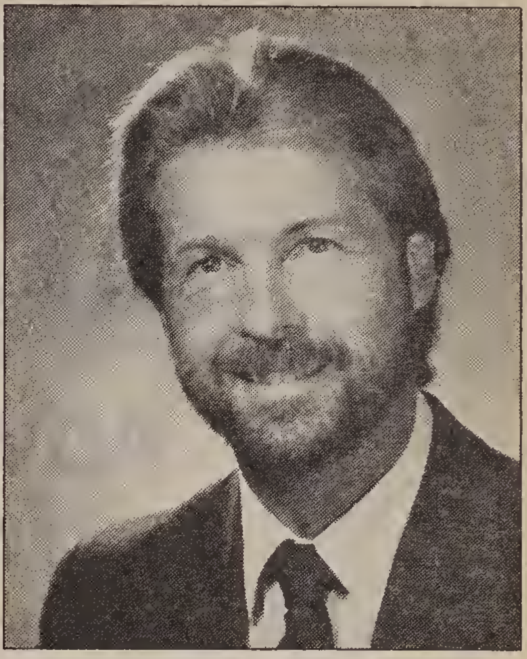
Call-By-Call Service Selection

Eventually, the company intends to use the Primary Rate Interface link to support ISDN Call-By-Call Service Selection, which enables customers to use a single T-1 line to access multiple services at an AT&T point of presence.

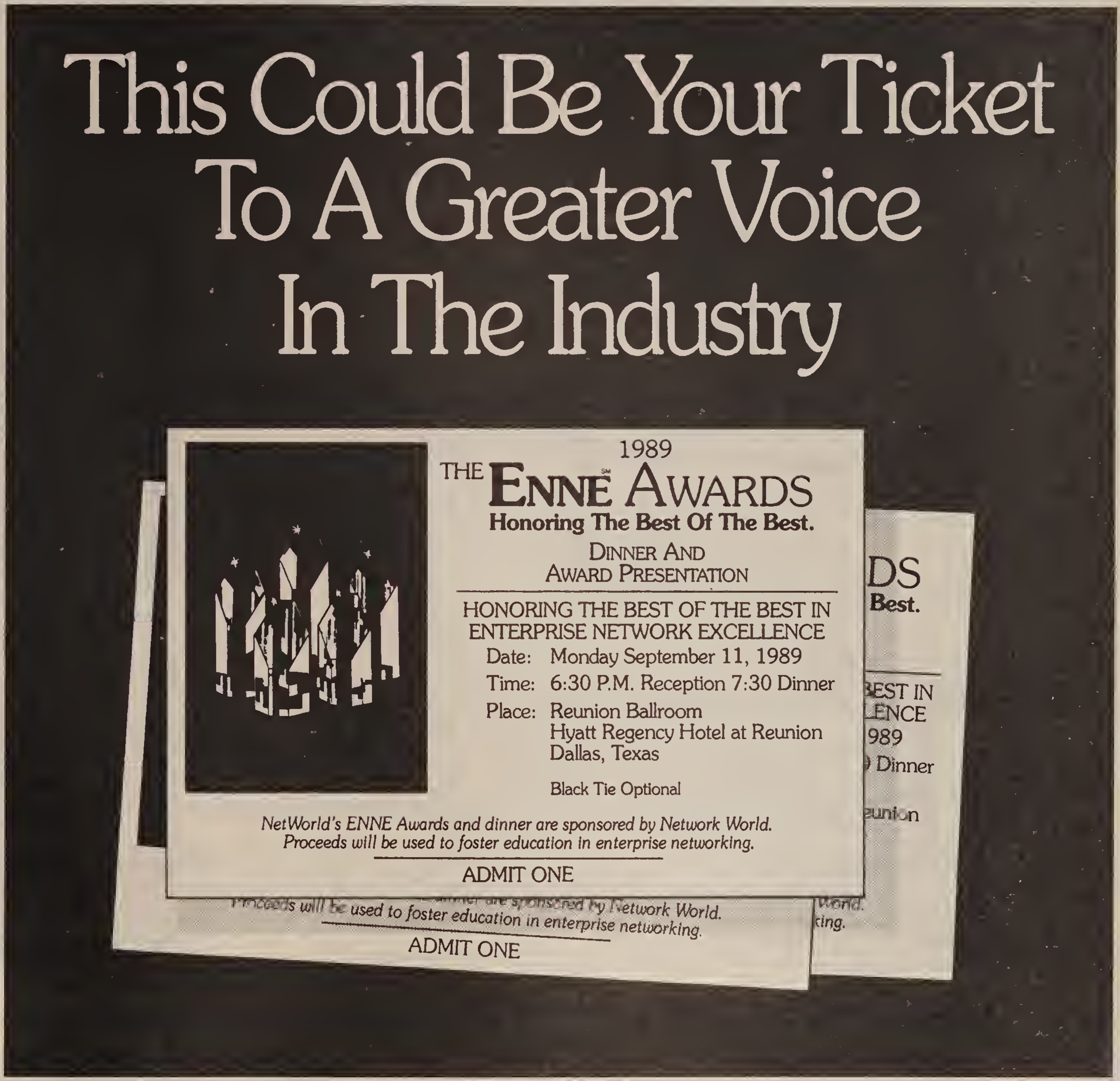
Although many customers use T-1 lines to access AT&T services, the 24 64K bit/sec lines within the T-1 have to be dedicated to specific services, such as Megacom or Megacom 800. "With Call-by-Call, we can take advantage of more services with less dedicated access," Kelley said.

The feature may enable the company to cast off three of its 12 T-1 access lines over the next three to six months, Kelley said. "Generally, whenever you combine trunk groups into a common set, you gain economies," Kelley said.

Call-by-Call "may not be enough to eliminate a T-1; we may just free up a lot of channels for growth," Kelley said. "A 25% decrease is ambitious but is certainly possible." ◘



John Hancock's Stephen Kelley



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Honoring The Best Of The Best.
DINNER AND
AWARD PRESENTATION
HONORING THE BEST OF THE BEST IN ENTERPRISE NETWORK EXCELLENCE
Date: Monday September 11, 1989
Time: 6:30 P.M. Reception 7:30 Dinner
Place: Reunion Ballroom
Hyatt Regency Hotel at Reunion
Dallas, Texas
Black Tie Optional

NetWorld's ENNE Awards and dinner are sponsored by Network World.
Proceeds will be used to foster education in enterprise networking.

ADMIT ONE

Tickets are at a premium.

And, accordingly, they're not for everyone. Yet when you consider the impact your participation engenders, you might just consider it an investment worth making.

In purchasing a ticket to the ENNE℠ Awards, you're doing more than gaining entry to a dinner.

You're gaining entry to a select group of companies able to mold the destiny of an industry.

Because, while the ENNE Awards are primarily designed to recognize achievement, they also recognize something else.

The fact that tomorrow's enterprise network will be determined by educational opportunities available today.

That's why all the proceeds from the ENNE Awards dinner will be channeled toward educational programs furthering the understanding and use of enterprise networking.

Your participation on September 11 will translate into opportunities for years to come.

And that's a ticket to a bright, shiny future.

RESERVE YOUR TICKETS TODAY!

The ENNE Awards Banquet will be held 6:30 P.M., Monday, September 11, 1989 in the Hyatt Regency Hotel at Reunion in Dallas, Texas during the NetWorld '89 Show.

Only 400 tickets are planned for sale.

For ticket information call
(212) 983-4965

THE ENNE℠ AWARDS
Honoring The Best Of The Best.

THE ENNE AWARDS PROGRAM 305 Madison Avenue, Suite 2140, New York, NY 10165

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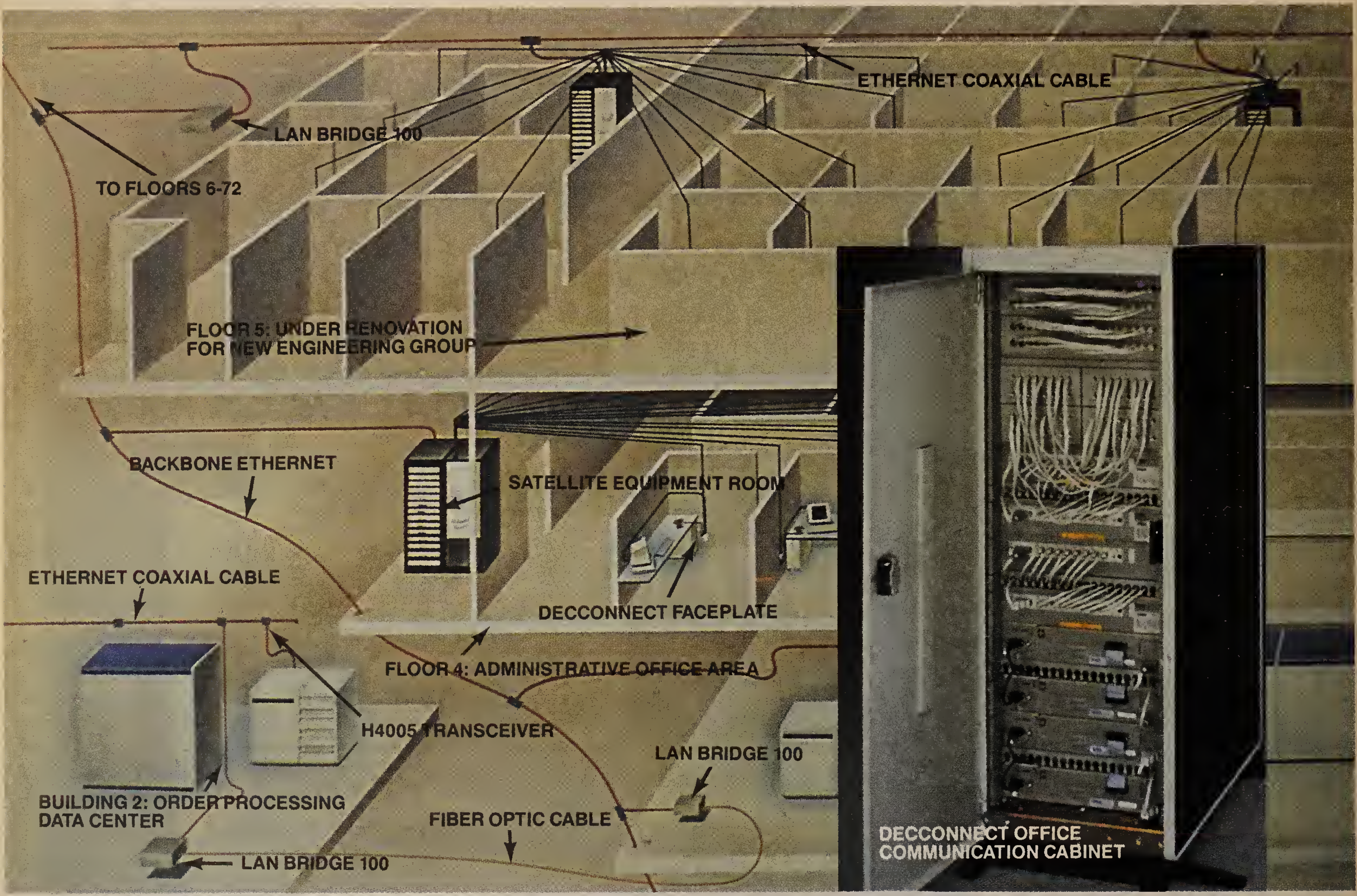

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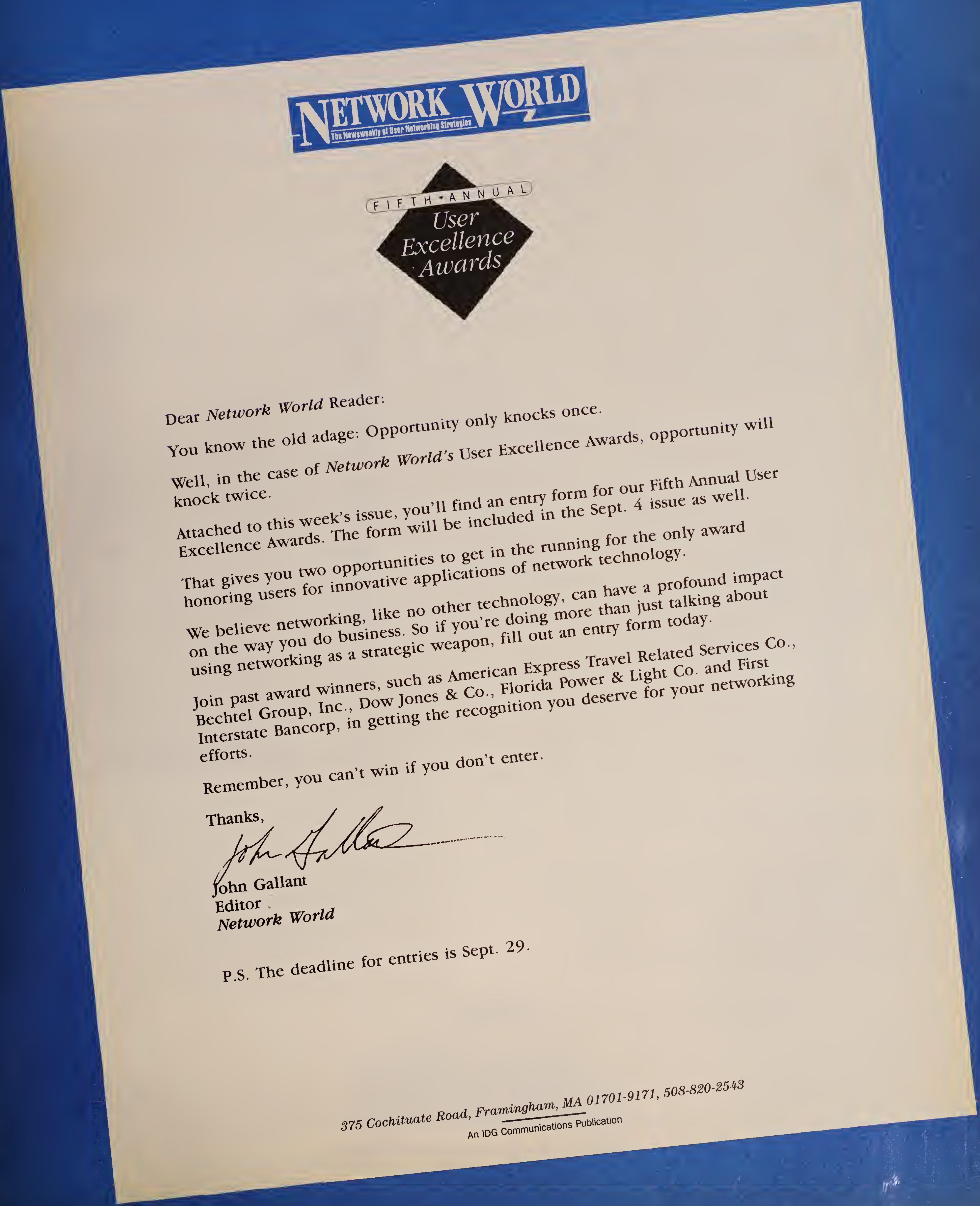
Make sure you're in the running for our User Excellence Awards!



NETWORK WORLD
The Newsweekly of User Networking Strategies

FIFTH ANNUAL
User Excellence Awards

Dear *Network World* Reader:

You know the old adage: Opportunity only knocks once.

Well, in the case of *Network World's* User Excellence Awards, opportunity will knock twice.

Attached to this week's issue, you'll find an entry form for our Fifth Annual User Excellence Awards. The form will be included in the Sept. 4 issue as well.

That gives you two opportunities to get in the running for the only award honoring users for innovative applications of network technology.

We believe networking, like no other technology, can have a profound impact on the way you do business. So if you're doing more than just talking about using networking as a strategic weapon, fill out an entry form today.

Join past award winners, such as American Express Travel Related Services Co., Bechtel Group, Inc., Dow Jones & Co., Florida Power & Light Co. and First Interstate Bancorp, in getting the recognition you deserve for your networking efforts.

Remember, you can't win if you don't enter.

Thanks,

John Gallant

John Gallant
Editor
Network World

P.S. The deadline for entries is Sept. 29.

375 Cochituate Road, Framingham, MA 01701-9171, 508-820-2543
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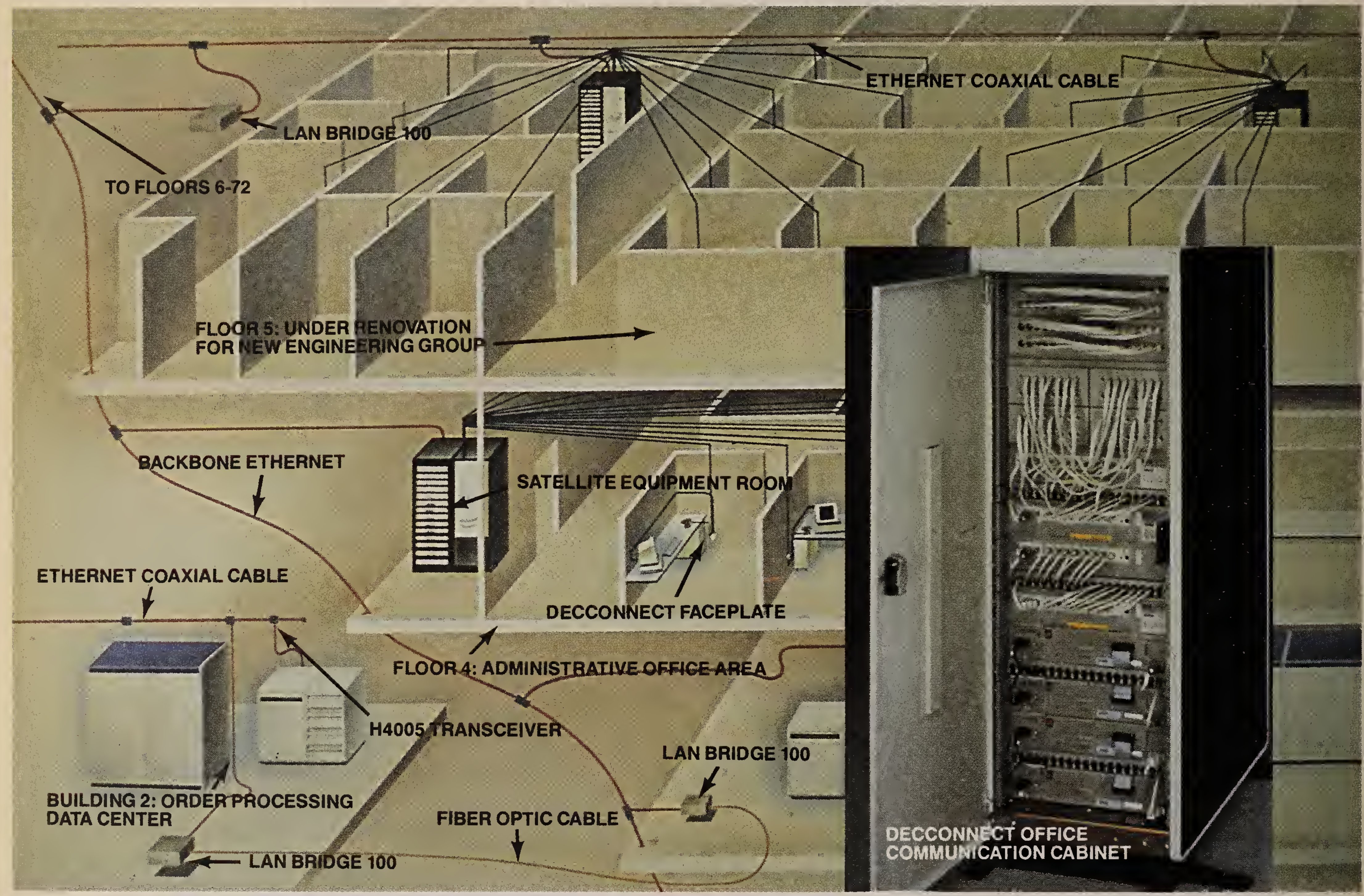

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FIFTH ANNUAL

User Excellence Awards

Get in the running for Network World's User Excellence Awards

Network World believes networking can change the way organizations do business, helping them become more competitive, more productive and more responsive to opportunities and changing market forces. Through our annual User Excellence Awards, we honor users that have applied network technology to gain competitive advantages.

To help us determine how innovative your organization is in using network products and services, please complete the brief postage-paid questionnaire below and return it no later than Sept. 29. (If you need additional space, use the back of the form or type your responses on a separate sheet.) Your name, title, address and phone number must be included.

All User Excellence Award winners will be featured in the Dec. 18 issue of *Network World*. Awards will be presented at the Communication Networks conference in Washington D.C. in February 1990.

Remember, it's not how much you've spent on networking but what you've accomplished that counts. Good luck!

1 Name:

Title:

Company name:

Address:

Phone number:

2 Does your organization have a separate communications department with responsibility for both voice and data network expenditures? **YES/NO**

3 Is your network international in scope? **YES/NO**

If yes, how many countries does it encompass?

4 Please explain how networking has helped you to differentiate products and services from those of competitors or to launch new products and services.

5 Please explain how network technologies, such as EDI, have helped you build closer, more productive relationships with customers, suppliers or partners.

6 Does your network integrate multiple network architectures, such as IBM's SNA, DEC's DNA, TCP/IP, OSI and others? **YES/NO**

If yes, how is that being accomplished?

7 If you plan to implement ISDN, please explain why and how it will be done.

8 Does your company have a strategy for migrating to an integrated multimedia network that supports voice, data, image and video traffic? **YES/NO**

If yes, please explain.

9 What steps are you taking to contain communications costs?

10 What do you consider to be the most unique and innovative features of your network?

11 What was the single most important networking project your department undertook last year, and why was it important?

- STOP - HAVE YOU ANSWERED QUESTION 1?

NETWORK WORLD

The Newsweekly of User Networking Strategies

Has networking changed the way you do business?

Past User Excellence Award winners

1985	1986	1987	1988
Dow Jones & Co., Inc.	Florida Power & Light Co.	Unified School District 259 of Wichita, Kansas	American Express Travel Related Services Co.
First Interstate Bancorp	First Wisconsin National Bank of Milwaukee	Midlantic Banks, Inc.	Bechtel Group, Inc.

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Comments: